## THE INTERNATIONAL CONGRESS OF MATHEMATICIANS

CAMBRIDGE, MASSACHUSETTS, U.S.A., SEPTEMBER 4–12, 1940

On invitation by the American Mathematical Society, an International Congress of Mathematicians will be held in Cambridge, Massachusetts, in 1940.

**Former Congresses.** In connection with the World's Columbian Exposition in Chicago in 1893 there was an International Congress of Mathematicians. The first congress in Europe was held at Zürich in 1897, and the most recent one met in Oslo in 1936. In the interim, with a few omissions necessitated by the World War, there have been sessions about once every four years. These have all been in Europe except for that of 1924, which was held at the University of Toronto with the financial support of the province and the Dominion.

At recent congresses, the number of countries represented has been about 40, the number of members about 600, and the number of short papers submitted about 250.

**Time and place.** The dates of the Congress have been fixed as September 4–12, 1940. The Society will omit its usual summer meeting in 1940. Harvard University and the Massachusetts Institute of Technology will be the local hosts of the Congress. Some neighboring institutions will join in the hospitality, but all institutions in the United States and Canada are invited to consider themselves as participants. Mathematicians so desiring will be housed in the Harvard University dormitories at modest rates, and meals will be served at cost in the University dining rooms. There will be accommodations for members of families, special provision being made for the care of children. Those who prefer to live in hotels can be comfortably provided for in Cambridge or Boston. It is expected that the Society will be able to furnish room and board without charge for a considerable number of foreign guests during the week that they are in Cambridge. In connection with the Harvard Tercentenary, the American Mathematical Society and the Mathematical Association of America met in Cambridge in September, 1936. There is no need of assuring any of the 800 people who were present then that excellent arrangements will be made for the Congress.

**Organization.** Plans for the scientific features of the Congress are well under way. Following precedent, there will be a score of invited addresses, each of an hour's length, and sectional meetings for the presentation of short papers.

An innovation will be conferences, somewhat after the pattern of

recent international gatherings in Moscow for Topology and in Zürich for Probability. Each conference will be devoted to some field in which a vigorous advance has recently been made or is currently in progress. The purpose will be the exchange of information and opinion by specialists in the field, and the dissemination of new and important results among the mathematical public at large. This will be accomplished by a coördinated program of formal lectures and informal open discussion. Among the conferences will be one on Algebra, with Professor A. A. Albert as chairman, one on the Theory of Measure, Probability, and Allied Topics, with Professor Norbert Wiener as chairman, one on Mathematical Logic with Professor H. B. Curry as chairman, and one on Topology with Professor Solomon Lefschetz as chairman.

Six sections are tentatively planned for the presentation of papers: (I) Algebra and Theory of Numbers; (II) Analysis; (III) Geometry and Topology; (IV) Probability, Statistics, Actuarial Science, Economics; (V) Mathematical Physics and Applied Mathematics; (VI) Logic, Philosophy, History, Didactics. The International Commission on the Teaching of Mathematics proposes to have a session in connection with the Congress.

These short papers will be preferably in one of the official languages of the Congress (English, French, German, and Italian), and will not exceed ten minutes in length.

**Social features, excursions.** There will be many interesting entertainment features provided—reception, garden party, symphony concert, and banquet. In addition there will be a number of automobile excursions, and it is hoped that American mathematicians will be able to assist in the entertainment by putting their automobiles at the disposal of the Entertainment Committee for trips to be made out of Cambridge.

Every effort will be made to facilitate the travel at reasonable cost of foreign participants while in the United States. Previous to the Congress, opportunity will be given them to see New York City under the guidance of some mathematician. It is expected that an international exposition will be in progress at that time in the city. Excursions to Washington, Niagara Falls, and other places will be arranged if there is demand.

**Membership in the Congress.** Membership in the Congress will be open to all persons, whether they are able to be present in person or not. For regular members of the Congress, the fee is $10.00; these persons will receive the Proceedings of the Congress. Persons not participating in the scientific deliberations may become associate members, for

whom the fee is $5.00; they will not present papers nor receive the Proceedings but will be entitled to many of the other privileges of membership.

**Financial support.** Besides the support from Harvard University, Massachusetts Institute of Technology, and other institutions in the neighborhood, generous subventions have been subscribed for the Congress by the Carnegie Corporation, the Institute for Advanced Study, the National Research Council, and the Rockefeller Foundation.

**Information.** Detailed information will be sent in due course to all members of the American Mathematical Society. Others interested in receiving information may file their names in the Office of the Society, and such persons will receive from time to time information regarding the program and arrangements.

Communications should be addressed to the American Mathematical Society, 531 West 116th Street, New York City, U.S.A.

THE ORGANIZING COMMITTEE

## HARRY WALTER TYLER—IN MEMORIAM

With the sudden death of Harry Walter Tyler on February 3, 1938, this country lost an able administrator and a remarkable man. As a student he showed unusual mathematical power. After graduation, however, he chose to follow the path of "maximum usefulness rather than least resistance." As a consequence most of his life was devoted to administrative work, often but little related to Mathematics.

A native of Ipswich, Massachusetts, where he was born in 1863, he entered Massachusetts Institute of Technology at the age of seventeen as a freshman in the chemistry course. During his undergraduate years he led in student activities. For the love of it he took all the mathematics courses then offered, and after graduating in chemistry accepted an instructorship in mathematics. A few years later, accompanied by his wife, who as Alice Brown was a classmate in chemistry, he studied further abroad. One year was spent at Göttingen, a second at Erlangen, where he was awarded the degree of Doctor of Philosophy in 1889.

Years of strenuous work followed, during which he not only was promoted to a full professorship at the age of thirty, but actively participated in the administration of the Institute. As Secretary of the Institute (a position which at that time included the duties of Registrar, Director of Admissions, Secretary of the Faculty, Dean, and sometimes even Medical Director), as chairman of many important committees, particularly those on Admission and Courses of Instruction, as Adviser to the President, he was a guiding power during the early days when the very existence of the school was imperiled. With vision and sound judgment he worked untiringly to give the students the best instruction and broadest development possible.

At the same time he was anxious to build up his own department, of which he was elected head in 1901. For nearly forty years he was responsible for every appointment made. That the department grew from one of hardly more than freshman standard to a position of world importance during that period testifies to his success.

His active interests also extended to faculty and alumni relations. For some time he was Secretary of the M. I. T. Alumni Association and for several years he was President of the Faculty Club. As Chairman of the Walker Memorial Committee he guided the campaign which brought into existence the splendid student center, almost as much a memorial of Tyler himself as of the former president after whom it is named.

In the early days of the American Mathematical Society he was a member of the Council and of the Committee on Policy of the Transactions, and he was also Chairman of the Committee on College Entrance Requirements which reported in 1903. In 1904 he reported on the International Congress of Mathematicians for the Bulletin, and in 1925 he was Vice President of the Society.

He took a very active interest in the American Academy of Arts and Sciences, serving as Librarian, 1912–1914, and Corresponding Secretary, 1914–1924. For many years he was prominent in the American Association of University Professors, having been a charter member and having served as General Secretary from 1916 to 1934. At one time he also served as the Association's Vice President and worked on its Committee on Academic Freedom. He was a member of the College Entrance Examination Board, the Cosmos Club, the English Speaking Union, the History of Science Society, and the Society for the Promotion of Engineering Education, serving as chairman of its Committee on Entrance Requirements. He assisted in establishing

the Association of Mathematics Teachers of New England and spent years carrying on work in its behalf.

Many happy summers were spent with his wife and four daughters on the shores of Lake Winnipesaukee in New Hampshire. His love of the out-of-doors and mountaineering was expressed in his enthusiastic membership in the Appalachian Mountain Club, of which he was at one time president.

He submitted his resignation at the Institute of Technology in 1930 in order to continue his activities with the American Association of University Professors, whose central offices he moved to Washington. There he also held the position of Consultant in Science at the Library of Congress, energetically pursuing this work until the day of his death.

While his department is a living memorial, his activities outside his department have been his chief contribution to the Institute and to American education.

H. B. PHILLIPS

## CARTAN ON GROUPS AND DIFFERENTIAL GEOMETRY

*La Théorie des Groupes Finis et Continus et la Géométrie Différentielle traitées par la Méthode du Repère Mobile.* By Élie Cartan. (Cahiers Scientifiques, no. 18.) Paris, Gauthier-Villars, 1937. 6+269 pp.

This book, which originated from a course of lectures given in 1931–1932 at the Sorbonne, covers in a somewhat more explicit form essentially the same material as no. 194 (1935) of the Actualités Scientifiques et Industrielles (see the review, this Bulletin, vol. 41 (1935), p. 774). By means of the method of the repère mobile the author studies arbitrary manifolds $M_\lambda$ in a Klein space $R$ whose geometry is described by its group of automorphisms. The chief aim of this review shall be to bring out the axiomatic foundations of the theory.

Coördinatization of a space $R$ consists in a one-to-one mapping of the points $A$ of $R$ upon a manifold $\Sigma$ of (numerical) symbols $x$ serving as coördinates. In a Klein space such coördinatization is possible only with respect to a frame of reference, or briefly frame, $\mathfrak{f}$. An abstract group $G$ and a realization of it by means of one-to-one transformations of $\Sigma$ are supposed to be given. We thus deal with four kinds of objects: points $A$, symbols $x$, frames $\mathfrak{f}$, and group elements $s$, their mutual relation being established by two axioms (a) and (b):

(a) Any pair of frames $\mathfrak{f}, \mathfrak{f}'$ determines a group element $s=(\mathfrak{f}\to\mathfrak{f}')$ called the transition from $\mathfrak{f}$ to $\mathfrak{f}'$. Vice versa, any element $s$ of $G$ carries a given frame $\mathfrak{f}$ into a uniquely determined frame $\mathfrak{f}'$ such that $s=(\mathfrak{f}\to\mathfrak{f}')$. Succession of transitions $\mathfrak{f}\to\mathfrak{f}'\to\mathfrak{f}''$ corresponds to the composition of group elements:

$$s=(\mathfrak{f}\to\mathfrak{f}'),\quad t=(\mathfrak{f}'\to\mathfrak{f}'')\quad\text{imply}\quad ts=(\mathfrak{f}\to\mathfrak{f}'').$$

(The identical element is $\mathfrak{f}\to\mathfrak{f}$, and $\mathfrak{f}'\to\mathfrak{f}$ is the inverse of $\mathfrak{f}\to\mathfrak{f}'$.)

(b) With respect to a given frame $\mathfrak{f}$ each point $A$ determines a symbol $x=(A,\mathfrak{f})$ as its coördinate, thus setting up a one-to-one correspondence $A\rightleftarrows x$ between $R$ and $\Sigma$. The coördinate $x'=(A,\mathfrak{f}')$ of $A$ in another frame $\mathfrak{f}'$ arises from $x$ by the transformation associated with the group element $s=(\mathfrak{f}\to\mathfrak{f}')$ in the given realization.

Consequences: $\mathfrak{f}, \mathfrak{f}^*$ being any two frames, the equation $(A^*,\mathfrak{f}^*)=(A,\mathfrak{f})$ defines a one-to-one mapping $A\to A^*$ of $R$ upon itself, the *space automorphism* $\{\mathfrak{f},\mathfrak{f}^*\}$. If a group element $t$ changes $\mathfrak{f}, \mathfrak{f}^*$ into $\mathfrak{g}, \mathfrak{g}^*$, one evidently has at the same time $(A^*,\mathfrak{g}^*)=(A,\mathfrak{g})$. Hence the space automorphisms $\{\mathfrak{f},\mathfrak{f}^*\}$ form a group isomorphic with $G$; but their isomorphic mapping onto the elements of $G$ is fixed except for an arbitrary inner automorphism of the group $G$. Figures in $R$ which arise from each other by space automorphisms are considered *equal*.

We are concerned with $\lambda$-dimensional parametrized manifolds

$$M_\lambda:\quad x=x(t_1,\cdots,t_\lambda),$$

where $t_\alpha$ are real parameters. Let us employ for a moment ordinary real coördinates in $R$, $x=(x_1,\cdots,x_n)$. At a given point $A=(t_1,\cdots,t_\lambda)$ of $M_\lambda$ the functions $x_i(t_1,\cdots,t_\lambda)$ and their derivatives up to a given order $p$ constitute a contact element of order $p$, or briefly a $p$-spread. We obtain a succession of such spreads of orders $p=0, 1, 2, \cdots$, each of which is contained in the following. The central problem consists in deciding when two parametrized manifolds $M_\lambda$, $M_\lambda'$ are equal. In the analytic case one may ask instead under what circumstances two given $p$-spreads are equal,

and then apply such a criterion to the aforementioned succession of spreads of orders $p=0, 1, 2, \cdots$. We start with the lowest case, $p=0$, equality of two points.

All symbols arising from a given $x$ by the operations of our group form a *layer* $\phi=\Sigma(x)$ in $\Sigma$. The *point* $A$ belongs to $\phi$ if its coördinate with respect to some, and hence to every, frame $\mathfrak{f}$ lies in $\phi$; in a manner independent of the frames the stratification of $\Sigma$ transfers to $R$. Let us assume that $\Sigma$, when considered as the manifold of its layers, is $m$-dimensional and that $k_1, \cdots, k_m$ are parameters whose simultaneous values characterize and distinguish the individual layers within this manifold. They can be used as point invariants (invariants of order 0) thus solving the central problem for points. Cartan demands construction in the simplest possible way of a manifold $\Sigma_0$ in $\Sigma$ intersecting each layer at exactly one point $x_0$; $k_1, \cdots, k_m$ are introduced as parameters on $\Sigma_0$.

With every $x_0$ on $\Sigma_0$ there is associated the subgroup $G^0=G(x_0)=G(k_1, \cdots, k_m)$ of $G$ whose elements are realized by transformations leaving $x_0$ fixed. We assume $G$ to be an $r$-parameter continuous Lie group, and we denote by $\omega_1, \cdots, \omega_r$ a basis for the components of the generic infinitesimal element of $G$. Moreover, we ascertain a basis

$$\pi_i = c_{i1}(k)\omega_1 + \cdots + c_{ir}(k)\omega_r, \qquad i = 1, \cdots, m,$$

for those components whose vanishing characterizes the infinitesimal elements of $G(x_0)$; Cartan calls them the *principal components of order* 0. For a point $A$ belonging to the layer $\Sigma(x_0)$ the *frames* $\mathfrak{f}$ *of order* 0 are introduced by the requirement

$$(A, \mathfrak{f}) = x_0.$$

Transition among frames of order 0 is accomplished by means of the elements of the subgroup $G(x_0)$.

From a single point $A$ we pass on to a pair of points $AA'$, or more specifically to a line element $AA'$ issuing from $A$ ($A'$ infinitely near $A$), asking again when two such line elements $AA'$, $BB'$ are equal. Let $A$, $A'$ belong to the layers $\Sigma(x_0)$, $\Sigma(x_0')$, respectively; the frames $\mathfrak{f}$, $\mathfrak{f}'$ shall be restricted by the equations

$$(1) \qquad (A, \mathfrak{f}) = x_0, \qquad (A', \mathfrak{f}') = x_0'.$$

We want to know when there exists a frame $\mathfrak{g}$ such that

$$(A, \mathfrak{f}) = (B, \mathfrak{g}), \qquad (A', \mathfrak{f}) = (B', \mathfrak{g}).$$

We introduce the frame $\mathfrak{g}'$ arising from $\mathfrak{g}$ by the transition $\omega=(\mathfrak{f}\to\mathfrak{f}')$ and then obtain

$$(A, \mathfrak{f}) = x_0, \quad (A', \mathfrak{f}') = x_0' \mid (B, \mathfrak{g}) = x_0, \quad (B', \mathfrak{g}') = x_0',$$
$$(\mathfrak{f}\to\mathfrak{f}') = (\mathfrak{g}\to\mathfrak{g}').$$

A full system of invariantive characteristics of $AA'$ therefore consists of the values $k_i$, $k_i'=k_i+dk_i$ of the invariants at the points $A$ and $A'$, and of the set of transitions $\omega=(\mathfrak{f}\to\mathfrak{f}')$ among frames $\mathfrak{f}$, $\mathfrak{f}'$ satisfying (1). We choose $\mathfrak{f}'$ infinitely near to $\mathfrak{f}$ so that $\omega$ is infinitesimal. With $\mathfrak{f}$ fixed, the variation of $\mathfrak{f}'$ leaves the $m$ components $\pi_i$ untouched while assigning perfectly arbitrary values to the remaining $r-m$ components. If one passes from $\mathfrak{f}$, $\mathfrak{f}'$ to another pair by means of group elements $s$, $s+ds$ in $G(x_0)$, $G(x_0')$, respectively, then $\omega$ changes into

$$\bar{\omega} = s^{-1}\omega s + s^{-1}ds.$$

In other words, the $\pi_i$ undergo a nonhomogeneous linear substitution

$$\bar{\pi}_i = \sum_k \sigma_{ik}\pi_k + \delta\sigma_i$$

depending on $s$ only.

We apply our remark to all points $A'=(t_\alpha+dt_\alpha)$ in the neighborhood of a given point $A=(t_\alpha)$ on a parametrized manifold $M_\lambda$. On emphasizing dependence on the line element $(dt_\alpha)$ we shall get equations

$$dk_i = k_{i1}dt_1 + \cdots + k_{i\lambda}dt_\lambda, \qquad i = 1, \cdots, m, \tag{2}$$

and with respect to an arbitrary frame $\mathfrak{f}$ of order 0 in $A$,

$$\pi_i = b_{i1}dt_1 + \cdots + b_{i\lambda}dt_\lambda. \tag{3}$$

The matrix $\|b_{i\alpha}\|$ appears here as coördinate in a certain Klein space $R^{(1)}$ with the group $G(x_0)=G^0$, each element $s$ of $G^0$ being realized by a transformation of the coördinate of the special type

$$\bar{b}_{i\alpha} = \sum_k \sigma_{ik}b_{k\alpha} + \sigma^0_{i\alpha}.$$

With the new Klein space we may proceed as before, and we then will obtain a number of invariants $k_j^{(1)}$ of order 1 for our 1-spreads, a subgroup $G^{(1)}$ of $G^0$ depending on the values of the new invariants, and the "frames of order 1" forming a subclass of the frames of order 0 and turning into each other by means of the elements of $G^{(1)}$. A basis for those components of the generic infinitesimal element of $G$ whose vanishing characterizes the elements of $G^{(1)}$ may be ascertained by adding to $\pi_1, \cdots, \pi_m$ some further components

$$\pi_j^{(1)} = c^{(1)}_{j1}\omega_1 + \cdots + c^{(1)}_{jr}\omega_r. \tag{4}$$

The full invariantive characterization of a 1-spread consists in giving the values of $k_i$, $k_{i\alpha}$, and $k_j^{(1)}$. The coefficients $c^{(1)}$ in (4) depend on these arguments.

In the same fashion as from 0 to 1, one passes from order $p-1$ to $p$. The shrinkage of the group $G\supset G^0\supset G^{(1)}\supset \cdots$ must come to a standstill after a finite number of steps, and with the next step the production of new invariants will stop. On a parametrized manifold $M_\lambda$ all these invariants are functions of the parameters $t_\alpha$. Their coincidence for two such manifolds $M_\lambda$, $M_\lambda'$ is necessary and sufficient for the manifolds to be equal. This unicity theorem is accompanied by a corresponding existence theorem. For one-dimensional manifolds the invariants are subject to no restriction, while in the case of several parameters $t_\alpha$ certain integrability conditions must be satisfied.

It is possible, and becomes sometimes desirable, to investigate special classes of manifolds by imposing conditions on the invariants.

Curves in euclidean 3-space $E_3$ are one of the simplest examples of our theory. With respect to a cartesian frame, we have triples of numbers $(x_1, x_2, x_3)$ as coördinates; the space is homogeneous, and $\Sigma_0$ consists of the one symbol (0, 0, 0). The frames with the point $A$ of the curve as their origin are of order 0; those whose first axis, moreover, coincides with the tangent, are of order 1; and finally the Frenet trihedral is the one frame of order 2. Here the process comes to a standstill. There is no invariant of order 0, but there is one each of the orders 1, 2, 3, namely $ds/dt$ ($t$ being the parameter, $ds$ the arc element), curvature $\rho$, and torsion $\tau$, respectively. For the minimal curves in the (complex) $E_3$ for which the invariant $ds/dt$ vanishes, the above normalization of the frames of order 1 becomes impossible; they therefore require a separate treatment illustrating our remark in the preceding paragraph. The same is true for the plane curves with $\rho=0$.

Slightly more complicated is the study of manifolds without a fixed parametrization. One then wants to know when two manifolds,

$$M_\lambda\colon\ x = \phi(t_1, \cdots, t_\lambda) \qquad \text{and} \qquad M_\lambda\colon\ x = \phi'(\tau_1, \cdots, \tau_\lambda),$$

may be changed into each other by a suitable automorphism combined with a suitable transformation of the parameters. Both influences, of the arbitrary frame $\mathfrak{f}$ and of the arbitrary parameters $t_\alpha$, have to be taken into account. In that case one must combine the coefficients $k_{i\alpha}$ with the $b_{i\alpha}$ in (2) and (3) as coördinates in a Klein space $R^{(1)}$, since the transformation of the $t_\alpha$ affects the $b_{i\alpha}$ as well as the $k_{i\alpha}$ (although the latter are indifferent towards a change of frame). It is this problem with which Cartan deals in the present book, and in some way he reduces the second influence, the choice of parameters, to the choice of the frame. I did not quite understand how he does this in general, though in the examples he gives the procedure is clear. To me it seems advisable to keep both factors apart from the beginning; the process itself tends to normalize both in mutual interdependence as it advances to higher and higher orders. The same situation is met with everywhere in differential geometry. For instance, riemannian spaces could be treated by introducing coördinates and attaching to each point $A$ a frame, that is, a cartesian set of axes. Invariance is required with respect to arbitrary transformations of the coördinates and to orthogonal transformations of the frames which may depend arbitrarily on the point $A$. One knows how Gauss, Riemann, and Einstein got around the frames: the parameters once chosen define uniquely at each point an affine set of axes, and one takes advantage of it by treating cartesian geometry in terms of affine frames and a fundamental metric form rather than in terms of cartesian frames. Cartan goes here to the opposite extreme by normalizing the parameters in terms of the frames. I should advocate full impartiality on both sides as long as one deals with fairly general differential geometric problems.

The book under review pursues a three-fold purpose: it contains (1) an exposition of the general theory of finite continuous Lie groups in a terminology adapted to its differential geometric applications; (2) a general description of the method of repères mobiles; and (3) its application to a number of important examples. The arrangement is didactic rather than systematic. Thus the first examples, Chapters 1–3, on curves in $E_3$, minimal curves in $E_3$, ruled surfaces in $E_3$ (considered as one-dimensional manifolds of lines), precede the general formulation. Chapters 4–9, 11, 13, 14, deal with Lie groups. While the topics (1) and (3) are given in full detail, the central problem (2) emphasized by this review is but briefly dealt with, at the beginning of Chapter 10 more from the standpoint of transformation groups, at the beginning of Chapter 12 more from the abstract standpoint. In both chapters there follow further applications: curves in the affine and the projective planes, and arbitrary surfaces in $E_3$. With the last example, the only one concerned with manifolds of more than one dimension, the integrability conditions turn up; although their rôle in the theory of Lie groups is amply discussed, their general formulation as an intrinsic part of the existence theorem in the theory of repèrage is omitted.

All of the author's books, the present one not excepted, are highly stimulating, full of original viewpoints, and profuse in interesting geometric details. Cartan is undoubtedly the greatest living master of differential geometry. This review is incomplete in so far as it has tried to lay bare the roots, rather than describe the rich foliage of the tree which his book unfolds before its reader. We should not let pass unmentioned Jean Leray's merit in molding the lecture notes he took into something which is a true book and yet catches some of the vividness of the original lectures. Nevertheless, I must admit that I found the book, like most of Cartan's papers, hard reading. Does the reason lie only in the great French geometric tradition on which Cartan draws, and the style and contents of which he takes more or less for granted as a common ground for all geometers, while we, born and educated in other countries, do not share it?

HERMANN WEYL

## COURANT AND HILBERT ON PARTIAL DIFFERENTIAL EQUATIONS

*Methoden der mathematischen Physik.* Vol. 2. By R. Courant and D. Hilbert. (Die Grundlehren der mathematischen Wissenschaften in Einzeldarstellungen, vol. 48.) Springer, Berlin, 1937. 16+544 pp.

Thirteen years have elapsed between the publication of the first volume of Courant-Hilbert, *Methoden der mathematischen Physik*, and this concluding second volume. The two volumes are a beautiful, lasting, and impressive monument of what Courant, inspired by the example of his great teacher Hilbert and supported by numerous talented pupils, accomplished in Göttingen, both in research and advanced instruction. Courant came to Göttingen at a time of enormous political and economic difficulties for Germany, on a difficult inheritance, with the day of the heroes, Klein, Hilbert, and Minkowski drawing to a close. But by research and teaching, by personal contacts, and by creating and administering in an exemplary manner the new Mathematical Institute, he did all that was humanly possible to propagate and develop Göttingen's old mathematical tradition. How his fatherland rewarded him is a known story. The publication of the present volume seems to the reviewer a fitting occasion for expressing the recognition his work has earned him in the rest of the mathematical world.

The first volume treated a closed, relatively unramified field: the doctrine of eigen values and eigen functions. It met with enormous success, in particular among the physicists, because shortly after its publication these matters, due to Schrödinger's wave equation, gained an unexpected importance for quantum physics. This second volume covers the theory of partial differential equations in all of its aspects which are of importance for the problems of physics. Its table of contents is therefore necessarily much more variegated, preventing the book from attaining an equally perfect esthetic unity. But it makes up for this by its wealth of material, and it shares the first volume's high didactic accomplishments. Nowadays many mathematical books do not seem to be written by living men who not only know, but doubt and ask and guess, who see details in their true perspective—light surrounded by darkness—who, endowed with a limited memory, in the twilight of questioning, discovery, and resignation, weave a connected pattern, imperfect but growing, and colored by infinite gradations of significance. The books of the type I refer to are rather like slot machines which fire at you for the price you pay a medley of axioms, definitions, lemmas, and theorems, and then remain numb and dead however you shake them. Courant imparts an insight into a situation which has manifold aspects and develops methods without disintegrating them into a discontinuous string of theorems; and nevertheless, the essential results stand out in clear relief. Numerous interesting examples help to enliven and clarify the general theories. In still another respect I found this volume comforting: when one has lost himself in the flower gardens of abstract algebra or topology, as so many of us do nowadays, one becomes aware here once more, perhaps with some surprise, of how mighty and fruitbearing an orchard is classical analysis.

Here follows a brief characterization of what the several chapters of the book contain.

Chapter 1. The usual basic concepts, preliminaries, and isolated elementary methods, namely: Discussion of the manifold of solutions for typical examples, the partial differential equation of a given family of functions, irreducibility of systems to a

single equation, geometric interpretation of the equation of first order, complete and singular integrals. Special methods of integration (separation of variables, superposition), the Legendre transformation, linear and quasi-linear equations. The existence theorem for given initial values in the analytic case, treated by means of majorizing power series.

Chapter 2. Theory of characteristics, first illustrated by the quasi-linear equations. Solution of the equation of first order by means of its characteristic strips. The Hamilton-Jacobi theory, including its relationship to the calculus of variations and canonical transformations. The treatment exhibits all sides of these interrelated topics, which were favored subjects for Hilbert's lectures at Göttingen.

Chapters 3–7 deal in the main, though not exclusively, with differential equations of second order.

Chapter 3. The distinction between the hyperbolic, elliptic, and parabolic cases, even for systems of differential equations; the latter receive a more complete treatment than in any other place of which I know. Linear equations with constant coefficients. Plane waves with or without dispersion. Initial value and radiation problems, construction of more general solutions by the method of Fourier integrals, retarded potentials. Illustrative material: heat conduction, wave and telegraph equations. The appendix contains a particularly illuminating exposition of the Heaviside calculus, justifying it to a sufficiently wide extent by Laplace transformations and by a proper application of the process of dislocating paths of integration in the complex plane.

Chapter 4. Potential theory and elliptic equations. Potentials of mass distributions. Green's formula, the Poisson integral, the mean value theorem with its inversion. The boundary value problem is dealt with both by the alternating process and by integral equations. Boundary value problem and parametrix for general elliptic equations. N. Wiener's limit theorems.

The most original part of the book is probably the study of hyperbolic equations contained in Chapters 5–6. The physical ideas of a wave front, of propagation, of rays, the iconal, Huygens' principle and construction have to be rendered in a mathematically tenable and sufficiently general form. Riemann's method of integration, Picard's application of successive approximations, Hans Lewy's integration by introducing the parameters of the characteristic curves as independent variables, and finally Hadamard's profound investigations, which here find a simplified and very lucid exposition, pass muster one after the other and serve to discuss the initial value and the radiation problems, and to settle the questions of unicity and "causality," that is, the question on which part of the initial data (Abhängigkeitsgebiet) the value of the solution at a given point actually depends. Linear equations with constant coefficients, in particular the classical wave equation, receive their due special attention. Huygens' principle is proved both for the initial value and the radiation problem, with emphasis on the difference existing in this respect between even and odd dimensions. H. Lewy's method is used for proving the analyticity of the solutions of analytic elliptic equations. Very interesting are the mean value theorems, in particular one of considerable generality due to Courant's pupil, Asgeirsson, and their applications. The physical side of the problems is not neglected. The relations between physical intuition and mathematical theory are carefully exhibited and illustrated in detail by such important examples as the differential equations of hydrodynamics and of crystal optics.

The seventh chapter deals with the boundary and eigen value problems by means of the calculus of variations. This direct method is here worked out in more detail

than has been done before and is applied to transversal deformations and vibrations of plates and to the general 2-dimensional problem of elasticity. The chapter properly concludes with Plateau's problem which has recently entered upon a new phase through J. Douglas' ideas, and to which Courant himself has contributed largely during his last New York years.

The present volume is sprinkled throughout with a wealth of little new illuminating observations which this review had to skip. The author apologizes that lack of time prevented him from fitting out his book with a full sized index of literature and such paraphernalia. The same reason may be responsible for quite a few misprints on which the reader will occasionally stumble. But perhaps even these minor faults deserve praise rather than blame. Although I know that a craftsman's pride should be in having his work as perfect and shipshape as possible, even in the most minute and inessential details, I sometimes wonder whether we do not lavish on the dressing-up of a book too much time that would better go into more important things.

HERMANN WEYL

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## CONTRIBUTIONS TO THE CALCULUS OF VARIATIONS

*Contributions to the Calculus of Variations*, 1933–1937. (Theses submitted to the Department of Mathematics at the University of Chicago.) University of Chicago Press, 1937. 7+566 pp.

This volume is the third in the series of contributions to the calculus of variations published by the Department of Mathematics of the University of Chicago since 1930.* It contains thirteen doctoral dissertations, written under the direction of Professors Bliss, Graves, and Reid. The reader acquainted with the work of these mathematicians can make a fair guess as to the way in which responsibility for these papers is to be distributed among them.

The book is uniform in appearance and in style with the earlier ones. About half the papers are followed by a list of references or a bibliography. They are all written with care, conditions are carefully stated, and conclusions are clearly set out. Their contents give a clear picture of the direction in which the work in the calculus of variations has been developed at the University of Chicago in recent years. The contributions contained in the volume are the following:

1. *The problem of Lagrange with finite side conditions*, by J. W. Bower (pp. 1–52).
2. *Fields for multiple integrals in the calculus of variations*, by Byron Cosby, II (pp. 53–84).
3. *The minimum of a definite integral with respect to unilateral variations*, by J. D. Mancill (pp. 85–164).
4. *The Hamilton-Jacobi theory for the problem of Lagrange in parametric form*, by Van Bauman Teach† (pp. 165–206).
5. *Sufficient conditions for a minimum in the problem of Lagrange with isoperimetric conditions*, by I. E. Perlin (pp. 207–242).
6. *A boundary value problem of the calculus of variations*, by E. P. Wiggin (pp. 243–276).

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* The first of these was reviewed in this Bulletin, vol. 38 (1932), p. 617; the second in vol. 39 (1933), p. 641.

† Deceased before the publication of the volume.

7. *The inequalities of Morse for a parametric problem of the calculus of variations*, by R. H. Bardell (pp. 277–312).

8. *Conditions for a minimum of a functional*, by H. H. Goldstine (pp. 313–358).

9. *Studies of the inverse problem of the calculus of variations*, by N. A. Moscovitch (pp. 359–402).

10. *The problem of Lagrange with differential inequalities as added side conditions*, by F. A. Valentine (pp. 403–448).

11. *A generalized form of the problem of Bolza*, by C. H. Denbow (pp. 449–484).

12. *The dependence of a focal point upon curvature in the calculus of variations*, by A. S. Householder (pp. 485–526).

13. *Discontinuous solutions for the problem of Bolza in parametric form*, by M. F. Smiley (pp. 527–566).

The problems with which these papers are concerned do not have very close connection with one another, except insofar as numbers 1, 4, 5, and 10 deal with the problem of Lagrange, and numbers 11 and 13 with the problem of Bolza. In the discussion which follows, the papers will be considered in accordance with this grouping.

Miss Bower (pp. 1–52) discusses the problem of minimizing the integral $\int F(x, y_1, \cdots, y_n, y_1', \cdots, y_n')dx$ in the set of arcs $y_i = y_i(x)$ which are piecewise of class $C'$, join two fixed points, and satisfy a system of finite equations $\phi_\alpha(x, y_i) = 0$, $(\alpha = 1, \cdots, m < n)$, for which the matrix $\|\phi_{\alpha y_i}\|$ has rank $m$ along these arcs. It is treated by two methods, the first consisting in replacing the finite conditions by differential equations, the second in using the finite equations to eliminate $m$ of the unknown functions. In order to avoid normality difficulties in the first of these formulations, the end conditions are reduced, following Bolza, by leaving the initial values of the functions $y_1, \cdots, y_n$ undetermined. The problem becomes a Lagrange problem with variable endpoints, to which the usual methods are applicable with some modifications. Necessary conditions and sufficient conditions are thus obtained. In the second part of the paper $n-m$ equations $\phi_\tau(x, y_i) = z_\tau$ are adjoined to the equations $\phi_\alpha = 0$, so as to obtain a system which is solvable for $y_1, \cdots, y_n$. The problem is thus transformed into a problem without side conditions, for which familiar methods are available. The paper gives for the first time a complete set of conditions for this problem. It would be interesting to compare the result here found with those which could be obtained by applying the recent work of Hestenes and of Reid in which no assumptions of normality are made.

Paper 4 (pp. 165–206) deals with the Lagrange problem in parametric form for fixed endpoints. By associating with the differential equations $\phi_\alpha(y, y') = 0$ an equation $\phi(y, y') = 1$, which defines the parameter, and then treating the problem $\int f(y, y')dt = \min$, $\phi_\alpha(y, y') = 0$, $\phi(y, y') = 1$, an ordinary problem in $ty$-space is obtained. For this problem the author develops the usual conditions necessary for a minimum, and also the Hamilton-Jacobi theory. These results are then carried over to obtain corresponding conditions for the parametric problem.

The next paper, by Dr. Perlin (pp. 207–242), is devoted to the theorem of Lindeberg (compare Bolza, *Variationsrechnung*, p. 515) for the same Lagrange problem $J(C) = \int f(x, x')dt$, but with isoperimetric side conditions. The class $K$ of admissible curves $x_i = x_i(t)$ is constituted by continuous rectifiable arcs lying in a bounded closed region of $(x_1, \cdots, x_n)$-space which satisfy a set of differential equations $\phi_\beta(x, x') = 0$ and a set of isoperimetric conditions $\int_{t_1}^{t_2} g_\sigma(x, x')dt = l_\sigma$. The Weierstrass $E$ function is defined in the usual way in terms of the functions $H \equiv f(x, x') + \lambda_\beta \phi_\beta + \mu_\sigma g_\sigma$ where $f$ is the integrand of the integral to be minimized, the functions $\lambda_\beta$ are continuous multipliers, and $\mu_\sigma$ are constants. The generalization of the Lindeberg theorem which is

obtained asserts, stated roughly, that if the Weierstrass condition in its strengthened form is satisfied along a curve $C_0$, then for every positive $\epsilon$ there exists a positive $\delta$ such that $J(C) > J(C_0) - \epsilon$ for every admissible curve $C$ whose length exceeds that of $C_0$ by at least $\delta$. By means of this theorem the author then obtains sufficient conditions and also generalizations of the theorem of Osgood (compare Bolza, loc. cit., p. 280). The results obtained by McShane in his dissertation (published in vol. 1 of these contributions) are used in an important way; his methods prove to be very useful for the problem dealt with in this paper.

The final paper primarily concerned with the Lagrange problem is no. 10, by Dr. Valentine (pp. 403–448). Its problem differs from the usual Lagrange problem in this respect, that the minimizing functions, in addition to being solutions of the differential equations $\psi_\alpha(x, y, y') = 0$, must also satisfy a number of differential inequalities $\phi_\beta(x, y, y') \geqq 0$. The problem is treated by consideration of the equivalent problem, in which functions $y_i(x)$, $z_\beta(x)$ are sought that satisfy the conditions of the given problem, except that the inequalities are replaced by the differential equations $\phi_\beta - z_\beta'^2 = 0$. By means of this equivalent problem, the necessary conditions of Euler, Weierstrass, and Clebsch are established. In the discussion of conjugate points, and of sufficient conditions, the author considers "arcs without corners composed of $n$ subarcs" such that $\phi_1 = 0$ on some of these, while the remaining functions of the set $\phi_\beta$ are positive on all the subarcs, without reference to the equivalent problem. Indeed this problem does not lend itself to the usual treatment because it is a singular problem, owing to the absence of the functions $z_\beta'$ from the integrand. It may be possible to overcome this difficulty by use of the suggestions contained in a recent paper by Radon (Jahresbericht der Deutschen Mathematiker-Vereinigung, vol. 47 (1937), p. 220).

Dr. Denbow (pp. 449–484) treats a generalization of the Bolza problem obtained by replacing the end conditions by conditions involving a number of intermediate points as well, and by modifying all functions outside the integral sign in the functional that is to be minimized in a similar manner. It is then shown that this modified problem can be reduced to an equivalent Bolza problem in the usual form by the introduction of an enlarged set of unknown functions. By applying the methods for the treatment of a problem of Bolza as developed by Bliss, the usual necessary conditions and sufficient conditions for a minimum are obtained for normal arcs. It is pointed out that the method used in this problem can also be used to treat (1) the case in which the differential equations and the integrand in the functional that is to be minimized involve the coördinates of the endpoints and of a set of intermediate points; (2) a problem in which the functional to be minimized is of the form

$$g(x_1, y_i(x_1), x_0, y_i(x_0), x_2, y_i(x_2)) + \int_{x_1}^{x_0} f_1(x, y, y')dx + \int_{x_0}^{x_2} f_2(x, y, y')dx,$$

the finite side conditions have the arguments of $g$, and two sets of differential equations are to be satisfied, one on the interval $(x_1, x_0)$ and the other on the interval $(x_0, x_2)$—problems of this sort have arisen in applications to economic theory; (3) a problem in which is sought the minimum of an integral in the class of curves with fixed endpoints and with a fixed finite number of finite discontinuities.

The main purpose of Dr. Smiley's paper (pp. 527–566) is to establish conditions which insure that an arc of class $D'$ shall be a minimizing arc for the problem of Bolza in parametric form. In the proof of the theorem which accomplishes this purpose, the author follows the methods developed by Hestenes for the problem in ordinary form (see Transactions of this Society, vol. 42 (1937), p. 141), which in turn rest upon the definition of Mayer fields as given by Bliss. The necessary embedding theorem is obtained by the introduction of canonical variables.

The paper by Dr. Cosby (pp. 53–84) is the only one in this collection which is concerned with double integrals. On the basis of Bliss' definition of a field of extremal surfaces, necessary and sufficient conditions are obtained that a two-parameter family of space curves $u(x, y, z)=a$, $v(x, y, z)=b$, be a transversal family. These conditions take the form of a pair of partial differential equations, one of the first order and one of the second, which constitute the analogue for the double integral of the Hamilton partial differential equation of the simple problem. The differential equations thus obtained can also be interpreted as a condition to be satisfied by functions $A(x, y, z)$, $B(x, y, z)$, and $C(x, y, z)$ in order that the Hilbert invariant integral may be expressed by means of the line integral $\int A\,dx+B\,dy+C\,dz$. It is shown that, from the transversal families of an $n$-parameter family of fields ($n\geqq 2$), an $(n+1)$-parameter family of extremal surfaces can be obtained.

Paper 3 (pp. 85–164) takes up a study of unilateral variations in the plane and in 3-space. The literature on this problem is not very extensive; indeed, the second order conditions have thus far received little attention. Dr. Mancill makes a definite advance in the study of these conditions. He makes use of the geometric approach which has been useful in the simple problem. Families of extremaloids are introduced whose elements are obtained by piecing together extremaloids through each of the fixed endpoints and arcs tangent to the bounding curve, possibly partly coinciding with this curve. In terms of the behavior of the envelopes of these families, an analogue of the Jacobi necessary condition is formulated, following the method used by Graves (see American Journal of Mathematics, vol. 52 (1930), p. 1). Furthermore, conditions are stated which will insure the existence of fields of extremaloids, and by means of them sufficient conditions for a strong minimum are obtained for the case in which the bounding curve is not an extremal arc; a supplementary theorem deals with the special case in which this does happen. There is finally an extensive discussion of the case in which the bounding curve has corners. The problem of unilateral variations in space combines the results obtained by Graves with the methods used in the plane problem. The connection between the two problems is established by means of a curve $C$ on the bounding surface, which is the locus of the points at which the extremals of a certain one-parameter family touch the bounding surface $S$. An analogue of Jacobi's necessary condition, the existence of a field, and sufficient conditions are established. The bounding surface is supposed to be free from singularities.

The subject treated in Dr. Wiggin's paper (pp. 243–275) is the accessory boundary value problem for the problem of Bolza, associated with the study of the second variation in accordance with Bliss' method. By means of the condition $\int_{x_1}^{x_2}\eta_i\sigma_i dx=1$, the variations of the minimizing functions and of the $x$-coördinates of the endpoints are normalized. The accessory minimum problem is put into the form of a problem of Bolza, for which the Euler equations contain a parameter $\rho$; this in its turn is treated by means of an associated Lagrange problem with fixed endpoints. By use of the Jacobi condition for this problem the result is obtained that the second variation of the original problem will be non-negative if and only if the smallest characteristic value of $\rho$ is non-negative. A further result establishes the connection between the characteristic values of the boundary problem and the minimum value of the second variation in successive subclasses of admissible variations. The treatment follows in the main the methods familiar from the work of Richardson and others.

Dr. Bardell (pp. 277–312) deals with a problem of the calculus of variations in the large. He considers first the positive regular integral $\int_{t_1}^{t_2}F(x, y, x', y')dt$, satisfying the usual positive homogeneity condition on curves lying in a region $R$ of the $xy$-plane, extremal convex and bounded by a simple closed curve, non-singular and analytic

except for a finite number of corners. Extremal arcs joining two fixed points 1 and 2 are called adjacent if there is no other extremal arc joining these same two points whose slope at 1 lies between the slopes of the given arcs at that point. The type of an extremal arc joining these two points is the number of points conjugate to 1 which lie between 1 and 2, in accordance with Morse's use of the term. A sequence $S_k$, $(k=0, 1, \cdots, n)$, of extremal arcs joining 1 and 2 is a set of adjacent arcs of type $k$, preceded and followed by arcs of type different from $k$. It is shown that adjacent sequences differ in type by unity if 2 is not on the envelope of the family of extremal arcs through 1. The principal result is that, if $S_k$ represents the number of sequences of extremal arcs of type $k$ connecting two such points, then the relations $S_i > \sum_{k=-1}^{i-1}(-1)^{i+k-1}S_k$ for $i=0, \cdots, n-1$, and $S_n=\sum_{k=-1}^{n-1}(-1)^{n+k-1}S_k$, where $S_{-1}=1$, hold under the hypotheses mentioned above. It is shown furthermore that in the reversible case, in which $F(x, y, kx', ky')=|k| \cdot F(x, y, x', y')$, every sequence contains but a single arc, so that the relations just stated go over into a strengthened form of Morse's well known relations. These results are obtained by a careful study of the points of intersections of the extremal arcs through a fixed point.

The paper by Dr. Goldstine (pp. 313–358) lies in the field of the functional calculus. It considers a real-valued functional on the class $C$ of all real-valued functions $\xi$ on the interval $(0, 1)$, on the subclass $D$ of $C$ determined by the condition $\int_0^1 \xi(t)dt=0$, and on the subclass $N$ of $D$ whose elements have continuous derivatives on $(0, 1)$. The first chapter establishes a representation of a continuous, bilinear, symmetric functional on the composite class $C_1C_2$, a necessary and sufficient condition that such a functional be non-negative on $DD$, and a necessary and sufficient condition that it be positive on $NN$. The second chapter, based on the paper of Hildebrandt and Graves (Transactions of this Society, vol. 29 (1927), p. 127), introduces definitions of first and second differentials of a real-valued functional on a Banach space, and shows that the second differential of such a functional is bilinear, continuous, and symmetric. The next chapter presents three necessary conditions and two sufficient conditions that a functional $\mathfrak{J}$ defined on a region $C_0$ in $C$ shall have a minimum at an element of one or another of certain subsets of $C_0$. These conditions are stated in terms of properties of the first and second differential of $\mathfrak{J}$ and correspond roughly to conditions familiar in the calculus of variations. For the purpose of generalizing the Jacobi condition a boundary value problem is introduced. An example is then given of a functional for which this boundary problem does not possess characteristic values, thus illustrating a deviation from the functionals of the calculus of variations. The last chapter deals with two applications of the general theory. The first of these is the simple problem of the calculus of variations with fixed endpoints, for which the condition for the positive character of the second variation is obtained in terms of the characteristic values of the associated boundary problem. The second is the problem of minimizing the integral $\int_0^1\int_0^1 g[s, t, y(s), y'(s), y(t), y'(t)]ds\,dt$ in the class of arcs from $(0, y_1)$ to $(1, y_2)$.

In paper 9 (pp. 359–402), Dr. Moscovitch discusses first the existence of Lagrange problems which have a given Hamiltonian function $H(x, y, z)$. It is shown that if $H$ is a function of class $C^{(4)}$, whose matrix $\|H_{z_iz_k}\|$ is identically of rank $n-m$ in a region $R$, and if there exists a curve $E$, $y_i=y_i(x)$, $z_i=z_i(x)$, which satisfies the equations $y_i'=H_{z_i}$, then there exists a Lagrange problem which has $H$ as its Hamiltonian in the vicinity of $E$. Two Lagrange problems $f$, $\phi_\alpha$ and $g$, $\psi_\alpha$ are called equivalent if every solution of the equations $\phi_\alpha=0$ is a solution of $\psi_\alpha=0$ and conversely, and if $\int f dx$ and $\int g dx$ have the same value along every admissible curve. It is then shown that two Lagrange problems which have the same Hamiltonian are equivalent. The advance

which these results make over the earlier work of Carathéodory consists in the replacement of the condition that a particular $m$-rowed determinant of the matrix $\|H_{z_i z_k}\|$ be different from 0 over the entire range of $x$ by the condition that this matrix be everywhere of rank $m$. The author then applies his results to the inverse problem for space curves. The determination of an integrand which yields a given four-parameter family of curves in 3-space as extremals can now be replaced by the determination of a Hamiltonian; this is reduced, by use of the Hamilton-Jacobi differential equation, to the determination of a function $W(x, y, z, b)$ such that the given extremals are solutions of the equations $W_a=c$, $W_b=d$. The conditions under which such a $W$ exists are not determined. Another approach to the solution of the inverse problem is made through its connection with contact transformations, as pointed out by Douglas (Transactions of this Society, vol. 29 (1927), p. 407). Here extremals and transversals are taken together and a relation is obtained, necessary and sufficient for the equivalence of a calculus of variations problem and a contact transformation, which extends a result of Douglas. Finally, the author obtains a condition that a family of curves in $n$-space and a given transversality relation be extremals and transversality for a calculus of variations problem.

The paper by Dr. Householder (no. 12, pp. 485–526) deals with the properties of focal points on extremals of a parametric problem in $n$-space transversal to a variety $V$ of $1, 2, \cdots, n-1$ dimensions. This problem has been studied by Bliss for the plane (Transactions of this Society, vol. 3 (1902), p. 132) and by White for 3-space (ibid., vol. 13 (1912), p. 175). The results obtained by these authors suggest that, in case $V$ is a curve in $n$-space, the curvature of this curve will play an important part. Consequently the first section of the paper is devoted to the principal curvature of a curve in $n$-space, and its interpretation for a curve on a variety $V$, following the methods of Cartan in his treatment of Finsler spaces. These methods also underlie the discussion of the first and second variation of the integral $\int L(x, x')dt$, the conjugate point, and the Jacobi equations. The focal point of a curve $D$ is defined by an extension of the definition familiar from the simpler problems; the existence and position of focal points are discussed for varieties $V$ as well as for curves.

Anyone who looks through this book must be impressed by the active developments in the calculus of variations which are going forward at the University of Chicago. The volume under review shows that the modern theories are being cultivated as well as the problems and methods of the classical period.

ARNOLD DRESDEN

## SHORTER NOTICES

*Versicherungsmathematik.* By Friedrich Böhm. 2d edition. Vol. 1. (Sammlung Göschen, no. 180.) Berlin and Leipzig, de Gruyter, 1937. 151 pp.

This small, almost vest-pocket edition contains a surprisingly large amount of very useful information in actuarial mathematics. In this Volume 1, no attempt is made to divide the year into fractional parts, and minor details are omitted. However, the reader gets an excellent survey of the subject, even up to annuities and insurances upon two lives, without, however, an introduction to Makehamization. Of special interest to American readers will be the treatment of reserves, this treatment being somewhat comparable with that in the Menge-Glover text. The gross premium is, however, analyzed into *four* constituents—a 2 per cent charge for collection of premiums, in addition to net premium, first cost amortization, and administration or renewal expense. The examples shown for entrance ages of 40, 50, and 60 put first cost amortization at about 5 to 7% of the gross premium, and administration cost at about 1 to 3%. The Zillmer restriction of initial cost of 3.5% of the insurance is mentioned as 35 per mille. Readers not familiar with the per mille symbol, with its double zero at the base may read this as 35%, and be startled in imagining a $350 initial charge for writing a $1000 policy. Gross reserves are discussed from equations of the form: gross reserve plus present value of gross premiums equals net reserve plus present values of administration and collection costs. A second restriction attributed to Dr. A. Zillmer maximizes the provision for initial cost as that provided by the "$x+1$" method—full preliminary term. The book is well supplied with tables; it has an index at the end and excerpts from insurance laws, and on page 7 a short but well selected bibliography. Altogether, Dr. Böhm has given us a very interesting book.

E. L. Dodd

*Funzioni Analitiche.* By Francesco Tricomi. Bologna, Società Tipografica già Compositori, 1936. 6+110 pp.

*Funzioni Ellittiche.* By Francesco Tricomi. Bologna, Società Tipografica già Compositori, 1937. 9+274 pp.

These two books are nos. 14 and 15 in a series of monographs on applied mathematics published under the auspices of the National Council of Research and edited by Nicola Zanichelli.

The first of these volumes has as one of its purposes the presentation of the fundamentals of the theory of functions of a complex variable in sufficient detail to serve for the study of the elliptic functions as treated in the second volume; and in both volumes the author has endeavored to develop the theory in such a way as to make the applications to particular concrete problems as easy and direct as possible. In this he has succeeded admirably. It is no mean task to select from the wealth of the literature on analytic and elliptic functions the material that would best suit the author's purpose. The selections have been made with discrimination and have been treated skilfully. It is particularly refreshing to read a book on elliptic functions free from the mire of countless formulas that so often clutter books on this subject.

For the technical student wishing to acquire a working knowledge of the fundamentals these books are to be recommended. Furthermore, the student of pure mathematics will find the author's point of view invigorating.

A brief outline of the contents of the two books follows.

Funzioni Analitiche. Chapter 1. Complex numbers, functions, Cauchy-Riemann equations, harmonic functions, conformal mapping, irrotational fluid motion. Chapter 2. Cauchy's integral theorem, residues, Cauchy's integral formula, Dirichlet's problem, mean value theorems. Chapter 3. Infinite series, the Taylor and Laurent expansions, poles and isolated essential singular points. Chapter 4. Analytic continuation, Riemann surfaces, the elementary transcendental functions, Mittag-Leffler's theorem, Weierstrass's theorem.

Funzioni Ellittiche. Chapter 1. Historical introduction, periodicity, the Weierstrass $\pi$, $\zeta$, and $\sigma$ functions. Chapter 2. Elliptic integrals. (This is a particularly good treatment of the subject.) Chapter 3. The sn, cn, and dn functions of Jacobi, Jacobi's theta functions. Chapter 4. The $\pi$ functions related algebraically, transformations of elliptic functions, automorphic functions, Landen's transformation. Chapter 5. Applications: rectification of the ellipse and hyperbola, geodesics on an ellipsoid of revolution, loaded elastic columns, simple pendulum, a problem in conformal mapping arising in aerodynamics. Table of principal formulas.

G. E. RAYNOR

*Random Variables and Probability Distributions.* By Harald Cramer. (Cambridge Tracts in Mathematics and Mathematical Physics, no. 36.) London, Cambridge University Press; New York, Macmillan, 1937. 8+121 pp.

The two customary and time-honored approaches to the theory of probability start from the a priori definition of probability in terms of equally possible cases (Laplace) on the one hand, and from an empirical formulation of probability in terms of relative frequencies (von Mises) on the other. The former approach, while lending itself readily to a discussion of games of chance, fails inevitably to justify the application of the theory to physical science; the latter runs into analytical troubles in connection with the existence of certain limits essential to the theory. The present treatise, following chiefly the work of Kolmogoroff, avoids the difficulties of the two extreme attitudes by placing the meaning of probability on an axiomatic footing, regarding it merely as a given number, subject to certain limitations, associated with an event. The question as to the legitimacy of this association, which looms alarmingly in other treatments, is simply decided by a pragmatic appeal to its success. Thus the theory of probability becomes a branch of the theory of completely additive set functions.

The method of analysis used throughout the book is that of Fourier-Stieltjes transforms, which renders the work elegant and concise. The treatment is limited in so far as the author restricts himself to probability distributions in spaces of a finite number of dimensions, and foregoes practically all applications of interest to physical science. Clear and lucid in style and arrangement of material, Cramer's book is destined to prove of value not only for the mathematician who seeks a brief authoritative exposition of the fundamentals of probability theory, but also for the student of applied science who wishes to inform himself of the basic ideas of so useful a calculus.

HENRY MARGENAU

*Structure of Atomic Nuclei and Nuclear Transformations.* By G. Gamow. Oxford, Clarendon Press, 1937. 12+270 pp.

This book is a second edition of the book *Constitution of Atomic Nuclei and Radioactivity* which was reviewed in this Bulletin, vol. 39, p. 487 (1933). Unlike most second editions, the book is completely new, since the neutron was discovered after the writ-

ing of the previous edition. This discovery led to the theory according to which protons and neutrons are regarded as the bricks with which all atomic nuclei are built, and the present book, written by one of the leaders in his field, gives an authoritative and readable account of the theory of nuclear structure and of the experimental results in this field. The book is divided into three parts and the following chapter headings clearly indicate the topics treated. Part I: Stable nuclei. 1. Elementary particles and constituent parts of nuclei. 2. Nuclear binding energy and stability limits. 3. Spins and magnetic moments of nuclei. 4. Electromagnetic radiation of nuclei. Part II: Spontaneous nuclear transformations. 5. Spontaneous $\alpha$-disintegration. 6. $\gamma$-ray emission following $\alpha$-disintegration. 7. Spontaneous $\beta$-disintegration. 8. $\gamma$-ray emission following $\beta$-disintegration. Part III: Nuclear transformations by collisions. 9. Collisions without disintegration. 10. Nuclear reactions. 11. Nuclear reactions essentially involving radiation. 12. Relative abundance and origin of the elements.

F. D. MURNAGHAN

*Lectures on the Mathematical Theory of Electricity.* By F. B. Pidduck. Oxford, Clarendon Press, 1937. 8+110 pp.

This little book, which does not pretend to constitute either a complete or a balanced treatment of electromagnetism, is in the main a collection of very concise solutions of mathematical problems of experimental interest. As with many other British texts, most of the book is devoted to electrostatics and magnetostatics. In fact the law of electromagnetic induction does not appear until page 68, and the complete set of field equations are not stated until within twelve pages of the end of the book. The point of view is that of the generally discarded ether theory. Except for eight exercises for the student, the book contains no problems. References are mostly to Maxwell, A. G. Webster, and the author's *Treatise on Electricity.*

This book provides the student with a useful set of solutions of specific problems, but does not take him far into modern electromagnetic theory.

LEIGH PAGE

*Differentialgeometrie.* Vol. 1. *Raumkurven und Anfänge der Flächentheorie.* By R. Rothe. (Sammlung Göschen, no. 1113.) Berlin and Leipzig, de Gruyter, 1937. 132 pp.

This is intended to be the first volume of a set. The first hundred pages deal with space curves, and the last thirty with surfaces. The book closes with Meusnier's theorem and with some examples of applicability. The line element is introduced, but the second fundamental form and curvatures of surfaces are left to a second volume.

The book is written for students of the maturity of first year graduate students. Discussions and computations are given in enough detail, there are many applications to special cases and it is easy for the reader to see the geometrical meaning of the formulas. Vector notation is used from the start, but nothing more than a knowledge of scalar and vector products is assumed.

The book is not designed as an introduction to the study of quadratic differential forms or of tensor analysis, and everything is in three dimensions. Both the writer and the printer did their work with great care.

K. W. LAMSON

*Projektive Liniengeometrie.* By Robert Sauer. (Göschens Lehrbücherei, group 1, reine und angewandte Mathematik, vol. 23.) Berlin, de Gruyter, 1937. 194 pp.

This book was written with the specific purpose of interesting young mathema-

ticians in projective differential line geometry. With this end in view the author makes no attempt to give a complete presentation of any part of the subject, choosing rather to introduce the reader to several of the important phases of line geometry. These phases have been selected on the basis of their simplicity and their geometric content. The treatment is necessarily analytical, but the geometric significance of various theorems is illustrated by interpreting them in terms of the properties of certain discrete systems of lines. However, no mention is made of the representation of lines by the points of a quadric hypersurface in projective 5-space; the reviewer believes that the use of this representation would have added interesting geometric content to many of the theorems, especially in the earlier chapters.

In the first chapter the author presents the fundamental notions of projective line geometry. Two types of line coordinates are used, projective (Plücker) coordinates and vector coordinates for treating problems in euclidean space. The effect of a point transformation on the line coordinates is studied and applied to the classification of linear complexes and related topics. Chapter 2 is concerned with one parameter systems of lines, or ruled surfaces. The treatment is purely projective and parallels that usually given for space curves. Invariants are found and are shown to determine the surface to within a projective transformation. There is also a discussion of ruled surfaces invariant under a group of transformations. Chapters 3 and 6 discuss two and three-parameter systems in a similar manner. Tensors are used to determine the invariants of the systems. Chapter 4 considers some special two-parameter systems, including those invariant under a group of transformations. In Chapter 5, vector line coordinates and the theory of two-parameter systems are applied to the theory of infinitesimal deformations of surfaces.

R. J. WALKER

*Principles of Mathematics.* By Bertrand Russell. 2d edition. New York, Norton, 1938. 39+534 pp.

The first edition of this book is so well known, being the author's first important publication on mathematical logic, that any description here would be superfluous. The text is a reprint of the 1903 edition with, however, an interesting new introduction by the author discussing the developments in mathematical logic since it was first published. As he says "such interest as the book now possesses is historical" since the same ground was subsequently traversed with far more rigor in the *Principia Mathematica.*

In dealing with later developments the author discusses the three current views of the nature of logic and mathematics, the logistic (his own view), the formalist, and the so-called intuitionist. He sums up the discussion by saying that modern developments have resulted in an outlook "less Platonic, or less realistic in the medieval sense of the word"; that is, the view that the principles of logic, which we seem to find at different stages, are real and absolute, has receded. Put otherwise, Wittgenstein's view that what logic is "in itself" (whatever this means) "cannot be said but can only be shown" has been confirmed. Any attempt to "say" it can only be one exemplification out of many possible, not a uniquely true statement. The three current views differ, it is true, as to whether certain specific propositions are true or false, but, if Wittgenstein is correct, the removal of these differences would not result in showing that one of these views was true and the other two false, but would leave all three as alternative ideologies by which logic could be symbolized. The choice between them would be aesthetic, or based on convenience, depending on which brings into clear-cut relief some aspect of the matter in which we are interested.

The author's Introduction is not devoid of traces of an aesthetic standpoint. Discussing Carnap's *Logical Syntax of Language* containing two logical languages, one with, and the other without, the multiplicative axiom and the axiom of infinity, he says "I cannot myself regard such a matter as one to be decided by our arbitrary choice. It seems to me that these axioms either do, or do not, have the characteristic of formal truth. I confess, however, that I am unable to give any clear account of what is meant by saying that a proposition is true in virtue of its form."

A one-to-one correspondence can easily be established between these remarks and the well known couplet,

"I do not like thee, Dr. Fell
The reason why I cannot tell."

Of course, there is nothing surprising about this, as the impulse to many mathematical developments lies in similar obscure semi-aesthetic beginnings.

FREDERICK CREEDY

*Integralgeometrie*, I. By W. Blaschke. Paris, Hermann, 1935. 22 pp.

*Integralgeometrie*, V. By L. A. Santalo. Paris, Hermann, 1936. 54 pp.

*Vorlesungen über Integralgeometrie*. Vol. 1. By W. Blaschke. 2d edition. Leipzig and Berlin, Teubner, 1936. 60 pp.

*Vorlesungen über Integralgeometrie*. Vol. 2. By W. Blaschke. Leipzig and Berlin, Teubner, 1937. 68 pp.

*Über eine geometrische Frage von Euclid bis Heute*. By W. Blaschke. Leipzig and Berlin, Teubner, 1938. 20 pp.

The first two of these pamphlets are numbers 252 and 357 of the Actualités Scientifiques et Industrielles, and form the first two volumes of a series entitled *Exposés de Géométrie*, published under the direction of Wilhelm Blaschke. The last three pamphlets are volumes 20, 22, and 23 of the Hamburger Mathematische Einzelschriften.

The subject of integral geometry, devised for application to problems in geometric probability (such as Buffon's "needle problem"), has, under the guidance of Blaschke and his students, become an elegant theory of integral invariants, with applications not only to geometric probability, but also to differential geometry, maximum and minimum problems, and geometrical optics.

The first pamphlet is an exposition of the foundations of the subject. A "density" is defined for linear subspaces $E_r$ of euclidean $n$-space $E_n$; this density is a differential form in the coördinates of the space $S$ of $r$-dimensional linear subspaces of $E_n$. It has the following invariance properties: (1) invariance (Parameterinvarianz) under a change of coördinates in $S$; (2) invariance (Bewegungsinvarianz) under motions of $E_n$ into itself. A "kinematic density" is also defined; it is essentially a density for rectangular coördinate systems $C$ in $E_n$. In addition to the previous two invariance properties, it is unchanged (Wahlinvarianz) if each coördinate system $C$ is replaced by one rigidly joined to it. This makes it ideal as a density for the positions of a solid body in $E_n$. These densities are (except for a constant factor) uniquely determined by their invariance properties. Upon integration of them, one obtains an invariant "measure" for linear subspaces of $E_n$, and an invariant "kinematic measure." Similar measures can be defined in spherical and non-euclidean $n$-spaces.

The second pamphlet is an original study of the kinematic measure in $E_3$ with applications. Probably the most important and typical example of the results is the following. Let $K$ be any convex body in $E_3$; denote its volume by $V$, the area of its

bounding surface $S$ by $F$, and the integral of the mean curvature of $S$ extended over $S$ by $M$. Let $K_1$ be a movable convex body, with corresponding invariants $V_1$, $F_1$, $M_1$. Then the measure of the set of all positions of $K_1$ cutting $K$ is given by $8\pi^2(V+V_1)+2\pi(M_1F+MF_1)$. The following is an illustration of the manner in which such a result applies to the theory of geometric probability. Let $\overline{K}$ be a convex body inside $K$. Then the probability that a third convex body $K_1$ which cuts $K$ also cuts $\overline{K}$ is

$$W = \frac{4\pi(\overline{V} + V_1) + (M_1\overline{F} + \overline{M}F_1)}{4\pi(V + V_1) + (M_1F + MF_1)}.$$

The third pamphlet contains a study of point, straight line, and kinematic measures in the euclidean plane, with applications. Known formulas of Crofton, Poincaré, and Minkowski are proved anew. Some results are proved first for closed convex regions, and later extended to general complexes. An excellent and complete (up to 1936) bibliography is given at the end.

The fourth pamphlet is a continuation of the third, and obtains analogous results for the invariant measures in 3-space, both for closed convex regions and regions bounded by polyhedra. The bibliography is brought up to date.

The last pamphlet is a historical survey of a question in differential geometry in the large, which may be considered as arising from a "theorem" of Euclid. Euclid states that two polyhedra in space are congruent if the faces of one are congruent to the faces of the other. Since any polyhedron can be obtained by identifying pairs of sides in some plane polygonal net, two questions naturally come up: (1) Corresponding to a given plane polygonal net is there always a polyhedron in 3-space? (2) Is this polyhedron unique (that is, are any two such polyhedra congruent under euclidean notions)? Neither of these questions has an affirmative answer without qualification. Cauchy and others have given proofs of the uniqueness theorem (2) under the added hypothesis of convexity of the polyhedron. The existence theorem (1) is not true even under hypotheses on the polygonal net sufficient to insure the closure, orientability, and simply-connectedness of any resulting polyhedron, as well as certain natural metric assumptions on the net. In 1915 Weyl generalized the formulation of these questions as follows: (1) Corresponding to a given two-dimensional Riemannian metric with positive curvature is there always an ovaloid (closed convex surface) in $E_3$? (2) Is this ovaloid isometrically unique? The uniqueness theorem has been proved by several authors. A proof is given here which holds for polyhedra as well as surfaces with continuous curvature. A proof of the existence theorem has been sketched by Weyl and completed by Lewy. A new possible method of proof, based on the calculus of variations, is sketched by Blaschke.

All five of these pamphlets are well written, and should be of interest both to geometers and students of probability.

S. B. MYERS

*Theory of the Integral.* By Stanislaw Saks. 2d revised edition. English translation by L. C. Young. Monografje Matematyczne, vol. 7. Warsaw, 1937. 6+347 pp.

This is the third edition of the excellent and eminently useful book by Saks (the first appeared in 1930, in Polish, and the second in 1933, in French; the latter was reviewed in this Bulletin, vol. 40 (1934), pp. 16–18). It is, however, almost a new book, due to numerous changes in exposition and order of the material and important additions of new topics treated. The opening chapter, I (The integral in an abstract space), treats of the modern theory of abstract measure and integration. The basis is

specialized in Chapter II (Carathéodory measure) and Chapter III (Functions of bounded variation and the Lebesgue-Stieltjes integral). Chapter IV (Derivation of additive functions of a set and of an interval) contains a considerable amount of new material, in particular an exposition of important investigations of Ward. It is followed by Chapter V (Area of a surface $z=f(x, y)$), and Chapter VI (Major and minor functions) which contains an elegant treatment of the Perron integral and applications to the theory of functions of a complex variable (Looman-Menchoff theorem). Results of Chapter VII (Functions of generalized bounded variation) are used in the subsequent Chapter VIII (Denjoy integrals). The last chapter, IX (Derivates of functions of one or two real variables), contains a thorough exposition of results of Banach, Besicovitch, Denjoy, Khintchine, Ward, and many other authors. The book closes with two appendices by Banach (On Haar's measure, and The Lebesgue integral in abstract spaces) and with a ten page list of references. The excellent qualities of the book were sufficiently pointed out in the review of the French edition; they explain the remarkable success of the book. The reviewer has no doubt that a fourth edition, still further improved and augmented, will appear before long.

J. D. TAMARKIN

*Modern Theories of Integration.* By H. Kestelman. Oxford, Clarendon Press, 1937. 8+252 pp.

"The book is intended primarily for students who have covered the ground of G. H. Hardy's *Pure Mathematics* · · · . The account of the Lebesgue integral which is developed in this book follows the lines of C. Carathéodory's *Vorlesungen über reelle Funktionen* · · · ." The following list of contents gives an adequate idea of the material contained in the book; the numerals are chapter numbers: I, Sets of points; II, Riemann integration; III, Lebesgue measure; IV, Sets of ordinates and measurable functions; V, Lebesgue integral of a non-negative function; VI, Lebesgue integrals of functions which are sometimes negative; VII, Functions of a single variable; VIII, Evaluation of double integrals; IX, Extensions of the Lebesgue integral; X, Fourier series. Chapter IX contains a simplified treatment of the Denjoy integral due to Romanovski. The exposition is rather detailed, but the title of the book appears to the reviewer somewhat misleading inasmuch as Stieltjes integrals and integration in abstract spaces are not even mentioned.

J. D. TAMARKIN

## NOTES

The International Astronomical Union met at Stockholm, from August 3 to August 10.

The International Conference on New Theories in Physics was held in Warsaw, beginning May 30, under the auspices of the International Institute of Intellectual Coöperation of the League of Nations. Those present from the United States included Professor John von Neumann, of Princeton University, and Professor E. P. Wigner, of the University of Wisconsin.

A conference on the application of statistical methods to industrial and engineering problems was held at the Massachusetts Institute of Technology, September 8–9, 1938, under the direction of the department of mathematics and the department of economics and social science. Among those to address the conference were Mr. L. H. C. Tippett, of the British Cotton Industry Research Association, Dr. W. A. Shewhart, of the Bell Telephone Laboratories, and Dr. S. S. Wilks, of Princeton University.

Professor J. B. S. Haldane has been awarded the Weldon Memorial Prize for 1938.

Professor J. E. Littlewood, Rouse Ball professor of mathematics at the University of Cambridge, has been awarded the De Morgan Medal for 1938 of the London Mathematical Society. The Medal, which is awarded triennially, will be presented at the next meeting of the Society, on November 17.

Professor W. Blaschke, of the University of Hamburg, has been named a member of the Academies of Leipzig and Munich and also an honorary member of the Academy of Sciences of Roumania.

Sir Arthur Eddington has been appointed to the Order of Merit by His Majesty the King of England.

Professor F. Enriques, of the Royal University of Rome, has been elected an honorary fellow of the Royal Society of Edinburgh.

Professor Tullio Levi-Civita has been elected to membership in the French Academy of Sciences.

Dr. N. E. Nørlund, professor of mathematics at the University of Copenhagen and director of the Danish Geodetic Institute, has been elected a foreign member of the Royal Society.

An honorary degree was conferred upon Professor V. Volterra, of Rome, by the University of St. Andrews at the time of the tercentenary celebration of the birth of James Gregory.

Professor E. T. Bell, of the California Institute of Technology, has been awarded the gold medal of the Commonwealth Club of California for his book entitled *Men of Mathematics*. The medal is awarded for "the best scholarship and research work published during 1937."

The University of St. Andrews conferred an honorary degree upon Dean G. D. Birkhoff, of Harvard University, on July 5, at the tercentenary celebration of the birth of James Gregory.

Dr. Vannevar Bush, of the Massachusetts Institute of Technology, has been appointed president of the Carnegie Institution of Washington, the appointment to take effect on January 1, 1939.

Professor Louise D. Cummings, of Vassar College, has retired with the title emeritus.

Associate Professor C. H. Currier, of Brown University, has retired with the title emeritus.

Professor A. O. Leuschner, of the University of California, has retired with the title emeritus. The degree of doctor of laws was conferred upon Professor Leuschner by the University of California.

Professor H. C. Richards, of the University of Pennsylvania, has retired with the title emeritus.

Professor F. K. Richtmyer, of Cornell University, has been awarded an honorary degree by Lehigh University.

Professor H. N. Russell, of Princeton University, has been elected an honorary fellow of the Royal Society of Edinburgh.

The University of Nebraska has conferred a doctorate of science upon Dr. J. T. Tate, professor of physics and dean of the College of Science, Literature and Arts of the University of Minnesota.

An honorary doctorate of engineering has been conferred by the University of Michigan upon Dr. Stephen Timoshenko, of Stanford University.

Dr. R. P. Boas has been appointed National Research Fellow in Mathematics for 1938–1939.

Assistant Professor L. V. Ahlfors, of Harvard University, has been appointed to a professorship at the University of Helsingfors.

Dr. C. A. Coulson, of Trinity College, Cambridge, has been appointed lecturer in mathematics in University College, Dundee.

Dr. K. Favre has been appointed to a professorship of mechanics at the Polytechnic School in Zurich.

Dr. R. H. Fowler, of the University of Cambridge, has been appointed director of the British National Physical Laboratory.

Dr. Ulrich Graf, of the Technical School of Charlottenburg, has been appointed to an assistant professorship at the Technical School of Danzig.

Professor S. Mandelbrojt has been appointed to a professorship at the Collège de France.

Professor Harry Schmidt, of the University of Leipzig, has been appointed to a professorship at the Institute of Research for Aviation at Berlin.

Dr. Hermann Schmidt has been appointed to a professorship at the University of Jena.

Dr. S. Wylie, research scholar in mathematics in the University of Aberdeen, has been appointed to a lectureship at Christ Church, Oxford.

Dr. Emil Artin, of the University of Hamburg, has been appointed to a professorship at Indiana University.

Assistant Professor Reinhold Baer, of the University of North Carolina, has been appointed to an associate professorship at the University of Illinois.

Dr. R. H. Bardell, of the University of Wisconsin at Milwaukee, has been promoted to an assistant professorship.

Assistant Professor S. F. Bibb, of Armour Institute of Technology, has been promoted to an associate professorship.

Assistant Professor J. H. Bushey, of Hunter College, has been promoted to an associate professorship.

Dr. Randolph Church, of the U. S. Naval Academy, has been promoted to an assistant professorship.

Assistant Professor J. M. Clarkson, of North Carolina State College, has been promoted to an associate professorship.

Dr. R. T. Crawford has been appointed chairman of the department of astronomy at the University of California at Berkeley.

Associate Professor H. B. Curry, of Pennsylvania State College, will spend this academic year at the Institute for Advanced Study.

Professor S. C. Davisson, of Indiana University, has retired.

Dr. A. H. Diamond, of the University of California at Los Angeles, has been appointed professor and head of the department of mathematics at Oklahoma Agricultural and Mechanical College.

Dr. W. H. Erskine, of Bethany College, has been appointed to an assistant professorship.

Dr. E. J. Finan, of the Catholic University of America, has been promoted to an assistant professorship.

Assistant Professor H. J. Gay, of Worcester Polytechnic Institute, has been promoted to a professorship.

Mr. W. L. Graves, of the University of Pennsylvania, has been appointed to an assistant professorship at Drury College.

Associate Professor D. C. Harkin, of Alabama Polytechnic Institute, has been promoted to a professorship.

Dr. M. L. Hartung, of Ohio State University, has been appointed to an assistant professorship in education at the University of Chicago.

Associate Professor T. W. Hatcher, of Virginia Polytechnic Institute, has been promoted to a professorship.

Dr. E. K. Haviland, of Johns Hopkins University, has been appointed to a professorship at Lincoln University.

Assistant Professor Ralph Hull, of the University of Illinois, has been appointed to a professorship at the University of British Columbia.

Dr. W. L. Hutchings, of Rollins College, has been promoted to an assistant professorship.

Associate Professor F. E. Johnston, of George Washington University, has been promoted to a professorship.

Assistant Professor G. M. Jones, of Howard University, has been promoted to an associate professorship.

Dr. S. H. Kimball, of the University of Maine, has been promoted to an assistant professorship.

Professor W. C. Krathwohl, of the Armour Institute of Technology, has been appointed director of the department of educational tests and measurements.

Dr. W. S. Lawton, of Temple University, has been promoted to an assistant professorship.

Dr. E. C. McCracken, of Iowa State College, has been appointed head of the department of physics at Teachers College, Columbia University.

Dr. Saunders MacLane, of the University of Chicago, has been appointed assistant professor at Harvard University.

Dr. A. C. G. Mitchell, of New York University, has been appointed head of the department of physics at Indiana University.

Assistant Professor Deane Montgomery, of Smith College, has been promoted to an associate professorship.

Professor E. L. Moreland, of the Massachusetts Institute of Technology, has been appointed dean of engineering.

Dr. S. B. Myers, of the University of Michigan, has been promoted to an assistant professorship.

Assistant Professor H. S. Pollard, of Miami University, has been promoted to an associate professorship.

Dr. Walter Prenowitz, of Brooklyn College, has been promoted to an assistant professorship.

Dr. W. C. Randels, of Northwestern University, has been appointed to an assistant professorship at the University of Oklahoma.

Associate Professor C. H. Rawlins, of the U. S. Naval Academy, has been promoted to a professorship.

Mr. E. K. Ritter, of the University of Richmond, has been promoted to an assistant professorship.

Associate Professor H. P. Robertson, of Princeton University, has been promoted to a professorship.

Dr. Erich Rothe, of William Penn College, has been promoted to a professorship.

Dr. D. T. Sigley, of the University of Kansas City, has been appointed to an assistant professorship at Kansas State College.

Assistant Professor F. C. Smith, of the College of St. Francis, has been promoted to a professorship.

Assistant Professor Gertrude Smith, of Vassar College, has been promoted to an associate professorship.

Dr. Alvin Sugar, of the University of California at Berkeley, has been appointed head of the department of mathematics and physics at St. Francis College, Loretto, Pa.

Professor Gabor Szegö, of Washington University, has been appointed to a professorship at Stanford University.

Associate Professor T. Y. Thomas, of Princeton University, has been appointed to a professorship at the University of California at Los Angeles.

Dr. C. C. Torrance, of Case School of Applied Science, will be a member of the Institute for Advanced Study during 1938–1939.

Dr. R. J. Trumpler, of the Lick Observatory, has been appointed professor of astronomy at the University of California at Berkeley to succeed Dr. A. O. Leuschner, whose retirement has been announced.

Assistant Professor Marie J. Weiss, of Newcomb College, Tulane University, has been promoted to a professorship and appointed head of the department of mathematics.

Professor J. B. Whitehead, of Johns Hopkins University, has been appointed director of the School of Engineering.

Professor K. P. Williams, of Indiana University, has been appointed chairman of the department of mathematics.

Dr. L. S. Winton, of North Carolina State College, has been promoted to an assistant professorship.

The following appointments to instructorships are announced: Brown University: Dr. S. E. Warschawski; University of Cincinnati: Dr. W. C. Taylor; Columbia University: Dr. J. V. Wehausen; Georgia School of Technology: Dr. G. B. Lang; Kansas State College: Mr. Robert Rawhouser; Kent State University: Dr. Emma J. Olson; Lehigh University: Dr. A. E. Pitcher, Dr. M. F. Smiley; Michigan State College: Dr. G. B. Van Schaack; University of Michigan: Dr. R. C. F. Bartels, Dr. P. C. Hammer; University of New Mexico: Dr. Douglas Derry; New York University: Dr. Morris Kline; Ohio State University: Dr. G. E. Albert; Princeton University: Dr. C. B. Tompkins; Queens College: Dr. N. A. Hall, Dr. Leo Zippin; University of Rochester: Dr. C. E. Clark; Rutgers University: Mr. R. E. Traber; Springfield Junior College: Mr. N. W. Wells; Syracuse University: Dr. A. P. Cowgill; Agricul-

tural and Mechanical College of Texas: Mr. Walter Jennings; Texas Technological College: Mr. C. P. Brady; Vassar College: Dr. Audrey Wishard; University of Virginia: Dr. W. T. Puckett, Dr. G. E. Schweigert; University of Wisconsin: Dr. L. R. Wilcox.

The death of Marius Lacombe, of the University of Lausanne, on March 19, 1938, at the age of seventy-six, is announced.

Professor L. Maillard, of the University of Lausanne, died January 7, 1938, at the age of seventy.

Dr. E. W. Brown, former president of the American Mathematical Society and professor emeritus of Yale University, died July 22, 1938, at the age of seventy-one. He had been a member of this Society since 1892. A more adequate notice will appear in an early issue of the Bulletin.

Dr. W. W. Campbell, president emeritus of the University of California and director emeritus of the Lick Observatory, died June 14, 1938. He was seventy-six years of age.

Professor Jacob Kunz, of the University of Illinois, died July 18, 1938, at the age of sixty-four.

# ABSTRACTS OF PAPERS

## SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

323. R. G. Archibald: *Relatively highly composite numbers.*

Highly composite numbers have been defined and properties have been obtained by S. Ramanujan. The present paper defines a *relatively highly composite number* with reference to a sequence of integers containing an infinitude of primes. For such an arbitrary sequence it is shown that the series of reciprocals of the relatively highly composite numbers is convergent. Further results are obtained for relatively highly composite numbers with respect to arbitrary sequences, and also with respect to certain classes of sequences. (Received July 26, 1938.)

324. L. A. Aroian: *The moments of F and of z.*

R. A. Fisher has shown that the distribution of $z=1/2 \log s_1^2/s_2^2$ is $P(z)=(2n_1^{n_1/2}n_2^{n_2/2}e^{n_1z})dz/B(n_1/2,\ n_2/2)(n_1e^{2z}+n_2)^{(n_1+n_2)/2}$ and that of $F=e^{2z}$ is $P(F)=(n_1^{n_1/2}n_2^{n_2/2}F^{n_1/2-1})dF/B(n_1/2, n_2/2)\cdot(n_1F+n_2)^{(n_1+n_2)/2}$. From these, the moments of $F$ and the semi-invariants of $z$ are found, and the approach to normality of both distributions is studied. By use of the Type III curve, the results are applied to finding approximations of the 5% and 1% points of $z$. Other applications are indicated. (Received July 14, 1938.)

325. D. H. Ballou: *On the location of the roots of real polynomial equations when two roots are equal.*

If $a+ib$ is a complex root of the real polynomial equation $f(x)=\sum_{k=0}^{n}a_kx^k=0$, then the point $(a, b)$ lies on the curve $\phi(x, y)\equiv f'(x)-y^2f'''(x)/3!+\cdots+(iy)^{\lambda-1}f^{(\lambda)}(x)/\lambda!=0$, where $\lambda$ is the largest odd integer less than or equal to $n$. In this paper, equations $f(x)=0$ which have double roots are considered, and it is proved that if $a'+ib'$ is any root either real or complex, other than the double root, then the point $(a', b')$ is a real focus of the curve $\phi(x, y)=0$. (Received July 25, 1938.)

326. W. D. Baten: *Concerning the distribution of the means of n independent chance variables when each is subject to a certain frequency law.*

The first four moments about the mean of the distribution of the sample averages were derived by employing results obtained from sampling theory. On applying Pearson's criteria for his types, it was found that the distribution of the sample

averages was a Type I distribution. Pearson's criteria depend on the first four moments only. On examining the fifth moment about the mean of the distribution of the sample averages, it was found that the distribution of the sample averages did not satisfy the criteria for a Type I distribution. (Received July 21, 1938.)

327. P. O. Bell: *Integral invariants of projective differential geometry.*

In this paper, the author characterizes two well known integral invariants associated with an analytic surface, namely, the integral of the projective linear element and the integral of Fubini called the projective arc length. These characterizations afford simple geometric interpretations of the pangeodesics and the projective geodesics, the families of extremals of the above named integrals. The projective normal at a point of the surface, inasmuch as it is the cusp-axis of the projective geodesics passing through that point, is thus completely determined geometrically. Finally, a general class of integral invariants containing numerous special integrals of interest is characterized geometrically. Among these special integrals, perhaps the most notable are the integral of the projective linear element and the two integrals of Sullivan whose families of extremals have at a point the scroll directrices of Sullivan as cusp-axes. (Received July 16, 1938.)

328. Richard Brauer: *On $\mathfrak{p}$-adic and modular representations of semi-simple algebras.*

Let $I$ be an order (not necessarily maximal) of a semi-simple algebra $A$ of rank $n$ over an algebraic number field $K$. Let $e_1, e_2, \cdots, e_n$ be an integral basis of $I$. Form the regular representation $R$ of $A$ with basis $e_i$. If $\mathfrak{p}$ is a prime ideal of $K$, then $R$ can be taken as a modular representation (mod $\mathfrak{p}$) and split into indecomposable parts $U_i$ and irreducible constituents $F_i$. The investigation of this question is closely tied up with the study of $\mathfrak{p}$ as an ideal of $I$. On the other hand, $R$ may be considered as a representation of the $\mathfrak{p}$-adic algebra $A_\mathfrak{p}$ in the $\mathfrak{p}$-adic field $K_\mathfrak{p}$, and the irreducible parts $\overline{F_k}$ may be formed. Any $U_i$ can be obtained from a $\mathfrak{p}$-adic representation by taking the latter modulo $\mathfrak{p}$. Therefore $U_i$ can be split into $\overline{F_k}$'s. On the other hand, every $\overline{F_k}$ can be split into $F_i$'s. A relation between these two kinds of decompositions is given. The results can also be extended to more general fields $K$. (Received July 26, 1938.)

329. R. V. Churchill: *On the problem of temperatures in a non-homogeneous bar with discontinuous initial temperatures.*

The temperature function is required to satisfy the heat equation with variable coefficients, to vanish at $x=0$ and $x=1$, and to approach $F(x)$ as $t$ approaches zero, where $F(x)$ is piecewise continuous. Discontinuities in $F(x)$, or the failure of this function to satisfy an end condition, add serious difficulties to the investigation of the uniqueness of a solution. A uniqueness theorem is established here. The additional conditions imposed by it upon the temperature function are of the type to be expected, physically, to eliminate the presence of instantaneous sources of heat. The theorem is applied to establish a solution as the only one which satisfies those natural restrictions. A series form as well as an integral form of the solution is found; both are necessary for the investigation. The asymptotic behavior at $t=0$ of the temperature function and its derivatives, at the end points, and at points of discontinuity of $F(x)$ in particular, is determined. (Received July 26, 1938.)

330. C. E. Clark: *Simultaneous invariants of a complex and subcomplex.*

Let $P$ and $Q$ be finite euclidean polyhedra with $Q \subset P$. Let $P$ admit of a simplicial division $K$ such that a subcomplex of $K$, say $L$, is a simplicial division of $Q$. Let $K_2$ and $L_2$ be the second barycentric subdivisions of $K$ and $L$. The simplexes of $K_2$ which have at least one vertex in $L_2$ determine a complex $N_2$. Although $N_2$ depends on the simplicial division $K$, certain properties of $N_2$ are independent of $K$. These invariants include the Betti groups (as defined in Alexandroff and Hopf, *Topologie*, p. 205) of the complex $B_2$ consisting of the simplexes of $N_2$ that have no vertex in $L_2$, the Betti groups of the complex $R_2$ consisting of the simplexes of $K_2$ have no vertex in $L_2$, and groups which are generalizations of the groups $H^r(B_2, R_2)$ (ibid., p. 345) and $N^r(N_2, R_2)$ (ibid., p. 293). Also, relations among the invariant groups are obtained. (Received July 23, 1938.)

331. H. S. M. Coxeter: *A method for proving certain abstract groups to be infinite.*

Given an abstract definition for a finite group, we may determine its order by systematically enumerating the co-sets of a recognizable subgroup (Proceedings of the Edinburgh Mathematical Society, (2), vol. 5, pp. 26–34). In practice, however, the work becomes too tedious if the number of co-sets is more than one hundred or so. If it is suspected that the group is actually infinite, its infinite order can sometimes be established by enumerating the co-sets of a subgroup of unknown order, so chosen that the unfinished tables show, by some kind of regularity, that they will forever remain unfinished. This method is illustrated by the hitherto unknown group $P^4=Q^4=(PQ)^4=(P^{-1}Q)^4=(P^2Q)^4=(PQ^2)^4=1$, in which the subgroup $\{P^2, Q^2, (PQ)^2, (QP)^2\}$ is seen to be of infinite index. (Received July 5, 1938.)

332. M. M. Day: *Regularity of function-to-function transformations.*

Hill (this Bulletin, vol. 42, p. 225) considered the transformation (1) $U_x(f)=\int_0^\eta K(x, y)f(y)dy$, $(0<x<\xi)$, on the class $V_1$ of bounded measurable functions $f$ of one real variable $y$ such that $\lim_{y\to\eta} f(y)$ exists. He derived conditions on $K(x, y)$ necessary and sufficient that (1) be regular on $V_1$, that is, that for each $f \in V_1$ and for each $x$, $U_x(f)$ exists and $\lim_{x\to\xi} U_x(f)=\lim_{y\to\eta} f(y)$. In this paper, the author first extends Hill's results by considering transformations of the form (1) on a class $V_m$ of bounded measurable functions of $m$ variables, and obtains analogous conditions for regularity. For each kernel $K(x, y)$, the domain of regularity $K$ is defined as the largest class of functions on which (1) is regular. Conditions are found under which, for a function $f$, $f \in K$. Using these, necessary and sufficient conditions are determined that (1) be regular on certain classes of functions containing $V_m$. (Received July 25, 1938.)

333. R. P. Dilworth: *Non-commutative arithmetic.*

This paper is a continuation of that described in abstract 44-5-188. The multiplication is less general than that considered in the previous paper in that it has the semigroup property and is closely connected with the lattice division; however, the lattice is not assumed to be closed with respect to the multiplication. The Dedekind modular condition plays an important role in determining the arithmetic of the lattice. With a suitable definition of prime elements, it is shown that each element of the lattice $\Sigma$ has a unique (up to similarity) decomposition into prime factors. Similarity is a re-

flexive, symmetric, transitive relation such that every element similar to a prime is also a prime. Of particular interest is the application to the arithmetic of a semigroup. Let $\Sigma$ be a non-commutative semigroup with a G.C.D. and an L.C.M. Then (i) the ascending chain condition in $\Sigma$, (ii) the descending chain condition for the factors of each element, and (iii) the modular condition are necessary and sufficient that $\Sigma$ have an arithmetic, that is, unique (up to similarity) decomposition into prime factors. (Received July 23, 1938.)

334. R. J. Duffin and A. C. Schaeffer: *Extension of a theorem of S. Bernstein to non-analytic functions.*

If $f(x)$ and its $n$th derivative are bounded by 1, $(-\infty<x<\infty)$, then it is known that the intermediate derivatives of $f(x)$ from 1 to $n-1$ are bounded, $(-\infty<x<\infty)$, by constants which are, however, greater than 1. By making stronger assumptions on the derivatives of $f(x)$, the authors obtain stronger results. Suppose $f(x)$ is real. If $(f(x))^2\leqq 1$ and $(f^{(n)}(x))^2+(f^{(n+1)}(x))^2\leqq 1$ for $-\infty<x<\infty$, it results that $(f^{(k)}(x))^2+(f^{(k+1)}(x))^2\leqq 1$ for $-\infty<x<\infty$ and $0\leqq k\leqq n$. It is seen that the equality is satisfied if $f(x)$ is $\cos x$. This is a generalization of a theorem of S. Bernstein on the derivative of a trigonometric polynomial. (Received July 25, 1938.)

335. Arnold Emch: *New point configurations and algebraic curves attached to them.*

In papers (Commentarii Mathematici Helvetici, vol. 4 (1932), pp. 65–73; Tôhoku Mathematical Journal, vol. 37 (1933), pp. 100–109) which appeared some time ago, the author treated a rather extensive class of Cremona transformations in $S_r$ with the property that to a point $(x_1, x_2, \cdots, x_{r+1})$ corresponds a point $(x_1', x_2', \cdots, x_{r+1}')$, and, with the same coordinates, to a point $(x_1, x_2, \cdots, x_k', \cdots, x_l, x_{l+1}, \cdots, x_k', \cdots, x_{r+1})$ corresponds the point $(x_1', x_2', \cdots, x_k, \cdots, x_l', x_{l+1}', \cdots, x_k, \cdots, x_{r+1}')$, for any number of transpositions $x_i, x_i'$. Such a transformation $T_r$ (involutorial) is $\rho x_i'=1/x_i$, $(i=1, 2, \cdots, r+1)$. The cases $r=2$ and $r=3$ give rise to the theorems: 1. On every diagonal triangle $A_1A_2A_3$ of a Steinerian quadrangle, there are $\infty^1\Delta_8$ configurations on the elliptic cubic invariant under $T_2$, with the property that the eight points of a $\Delta_8$ lie by twos on four lines through each $A_i$. 2. With the $T_3$ is associated a line complex of order three. On every point (generic) $B$, there is a cubic cone of the complex. Corresponding points of $T_3$ on this cone lie on a $C_7$ of genus three. On this $C_7$ there are $\infty^1\Delta_{16}$ configurations, such that the 16 points lie by twos on eight lines through each of $A_1(1000)$, $A_2(0100)$, $A_3(0010)$, $A_4(0001)$, and $B$. (Received July 8, 1938.)

336. W. W. Flexner: *A class of singular 2-manifolds.*

Singular manifolds are defined by Veblen, *Analysis Situs*, American Mathematical Society Colloquium Publications, vol. $5_2$, 2d edition, 1931, p. 95. A singular 2-manifold is here called "half-simple" if its singular complex (locus of points whose linked complexes are not spheres) consists of disjunct 1-manifolds (topological images of the circle) and isolated points. Half-simple 2-manifolds are classified by means of a matrix, topologically invariant except for permutations of rows and columns, which may be calculated from the incidence matrices of the manifold. The problem of finding all singular 2-manifolds with a given half-simple singularity is studied by means of the invariants appearing in the duality theorem for singular manifolds. (Received July 25, 1938.)

337. W. W. Flexner: *Duality theorems for singular generalized manifolds.*

Singular generalized $n$-manifolds $M$ are defined by Veblen, *Analysis Situs*, American Mathematical Society Colloquium Publications, vol. $5_2$, 2d edition, 1931, p. 95. Two extensions, applicable to them, of the Poincaré duality theorem are: $Y_p = Y_{n-p}$ and $Z_p = Z_{n-p}$, where $Y_p = R_p - \lambda_p - n_{p-1} + s_p$ and $Z_p = R_p - \lambda_p + \rho_p - n_p + s_{p-1}$. The number $R_p$ is the $p$th Betti number of $M$; $\lambda_p$ is the $p$th Betti number of the singular complex $L$ of $M$; $s_p$ is defined by Lefschetz, *Topology*, American Mathematical Society Colloquium Publications, vol. 12, 1930, p. 149; $n_n$ is defined by Alexandroff and Hopf. *Topologie*, p. 299, where $K_1$, as here used, is the closure of a simplicial neighborhood of $L$, and $K_2 = \overline{M - K_1}$; $\rho_p = R_p(K_1 \cdot K_2)$. That $n_p$ and $\rho_p$ are independent of the neighborhood $K_1$ is a consequence of a recent theorem due to C. E. Clark. (Received July 25, 1938.)

338. Bernard Friedman: *Linear diophantine equations in quaternion analysis.* I.

It is well known that a necessary and sufficient condition for the existence of integral quaternion solutions of the diophantine equation $AX + BY = C$ is that $C$ be divisible by the greatest common divisor of $A$ and $B$. The analogous equation $AX + YB = C$ has not been previously considered. In this paper the case $A = B$ is studied and the following result is obtained: A necessary and sufficient condition that there exist integral quaternion solutions of the diophantine equation $AX + YA = C$ is that the trace of $\bar{A}C$ be divisible by the norm of $A$ where $\bar{A}$ is the conjugate of $A$. (Received August 2, 1938.)

339. K. O. Friedrichs: *Underdetermined systems of linear partial differential equations and Lagrange's multiplier method.*

An elementary procedure for obtaining solutions of underdetermined systems of linear partial differential equations is described. Without integration one obtains solutions vanishing with derivatives at the boundary of a prescribed region. This procedure is applied to Lagrange's multiplier method in the case of linear partial differential equations as accessory conditions. The justification of this method is reduced to the establishment of necessary and sufficient conditions for the solutions of overdetermined systems. (Received August 2, 1938.)

340. O. E. Glenn: *The modular covariants* (mod 2) *of formal type, of the quantics of orders less than eight.*

Since, by a theorem due to the author, the arbitrary binary form, $f_m = a_0 x_1^m + a_1 x_1^{m-1} x_2 + \cdots + a_m x_2^m$, is reducible, modulo 2, in terms of formal modular covariants of $f_m$, of orders 1, 2, 3, the transformations being those of the total group $G_8$ (mod 2), it follows, by the principle of copied forms, that a complete covariant system of the set $(f_1, f_2, f_3)$ gives the respective systems of all single forms of orders one to seven, inclusive. In the present paper, the system of $(f_1, f_2, f_3)$ is constructed. It is composed of 239 invariants and covariants. Moreover, certain covariant types do not increase in number after a minimum $m$ is passed. Therefore it is possible to obtain, by theoretical considerations, a complete system of covariants of $f_m$ when $m$ is a positive, arbitrary integer. (Received July 26, 1938.)

341. Louis Green: *Twisted cubics associated with a space curve.*

The local geometry of an analytic curve immersed in a three-dimensional projective space is studied in this paper. The methods employed involve projection from and upon the osculating plane at a point of the curve, intersections of tangent developables with one another as well as with planes and quadrics, and certain dual considerations. Characterizations are obtained of various five-point twisted cubics and of associated tetrahedra, and new properties of higher order neighborhoods of the curve are found. (Received July 22, 1938.)

342. Marshall Hall: *A type of algebraic closure.*

If the scalar product $AB$ of vectors $A$ and $B$ vanishes, $A$ is said to annihilate $B$ on the left and $B$ is said to annihilate $A$ on the right. The left closure of a set of vectors $S$ is defined as the totality of left annihilators of the totality of right annihilators of $S$. The right closure is similarly defined. An algebra is said to be strongly closed if every vector ideal over it is its own closure, and weakly closed if every ideal is its own closure. It is shown that a weakly closed algebra has a unit and that weak closure does, in fact, imply strong closure. The closure of an algebra depends upon the closure of the ideals in the radical, and, as the author showed previously, a semi-simple algebra is closed. Various structure (lattice) properties of annihilators and closures are proved. (Received July 21, 1938.)

343. D. C. Harkin: *Matrix representation of algebraic units and the solution of algebraic equations.*

Matrix representation of certain algebraic units and factorization of certain symmetric determinants and their characteristic equations lead to a unified and simplified method for the algebraic solution of the general equations of the second, third, and fourth degrees. This method depends only on the inherent property of the coefficients as elementary symmetric functions of the roots. (Received July 18, 1938.)

344. T. R. Hollcroft: *Regular plane curve systems with more cusps than the number possessed by certain irregular systems of the same order.*

The first irregular plane curve system was discovered by B. Segre in 1929. It is of order $6\alpha$ and genus $12\alpha^2-9\alpha+1$, with $6\alpha^2$ cusps; and it is represented by the symbol $(6\alpha,\ 12\alpha^2-9\alpha+1,\ 6\alpha^2)$. In the present paper, regular curve systems $(6\alpha,\ 12\alpha^2-9\alpha-2,\ 6\alpha^2+3)$ are shown to exist for $\alpha=1, 2, 4, 8, 16, \cdots$. The two following theorems are thereby established: 1. Irregular curve systems of certain orders exist which are of higher genus and have fewer cusps than existing regular curve systems of the same respective orders. 2. A plane curve system may be irregular because of relations among the positions of its cusps, and for that reason only. (Received July 26, 1938.)

345. Charles Hopkins: *Concerning nil-rings with minimal condition for admissible left ideals.*

The main theorem asserts that a nil-ring $R$ is nilpotent provided that the minimal condition holds for left ideals which are admissible with respect to an operator system of a certain type. The following corollaries may be stated: Let $O$ be any ring with minimal condition for ordinary left ideals. Then the radical $R$ of $O$ is nilpotent; $O$ is semi-primary; any subring of $O$ which contains only nilpotent elements is itself nilpotent. (Received July 25, 1938.)

346. Harold Hotelling: *Tubes and spheres in n-spaces and a class of statistical problems.*

A *tube* in a Riemannian space is defined as the locus of points at a fixed distance from a curve $C$, measured along geodesics perpendicular to $C$. Simple and exact formulas are found for the $n$-dimensional volumes enclosed by tubes in both spherical and euclidean spaces. In these spaces, local self-overlapping exists if and only if the radius of the tube exceeds the radius of geodesic curvature of $C$. The spherical case has important statistical applications in determining the significance of regression equations, non-linear in a disposable parameter. In general Riemannian space series of powers of the radius giving the volumes of both geodesic spheres and tubes are investigated. The first terms coincide with the formulas for euclidean space. The next non-vanishing terms are determined in this paper in terms of known invariants, and it is shown that alternate terms in the series vanish. To determine the invariant expressions for the tubular volume, a new system of coordinates related to an arbitrary curve in Riemannian space is set up which is found to have interesting properties. (Received July 26, 1938.)

347. D. H. Hyers: *Pseudo-norms in linear spaces.*

Let $O$ be a partially ordered set with the Moore-Smith property that for $a, b$ in $O$ there is a $c$ in $O$ with $c>a$, $b$ (Garrett Birkhoff, Annals of Mathematics, (2), vol. 38 (1937), p. 40). Let there be ordered to each $x$ of a linear space $L$ and each $d$ of $O$, a non-negative real number $n(x, d)$ subject to the following postulates: (1) $n(x, d)=0$ for all $d$ in $O$ implies that $x=\theta$; (2) $n(\alpha x, d)=|\alpha| \cdot n(x, d)$; (3) $n(x, e) \geqq n(x, d)$ for $e>d$; (4) given $\epsilon, e$, there exist $\delta, d$ with $n(x+y, e)<\epsilon$ for $n(x, d)<\delta$, $n(y, d)<\delta$. The pseudo-norm of $x$ with respect to $d$ is called $n(x, d)$. It is found that the necessary and sufficient condition for a linear space to be pseudo-normable is that it be a Hausdorff space with continuous fundamental operations. This theorem makes possible a characterization of the abelian subgroups of a linear topological space. The above pseudo-norm is a generalization of that of von Neumann (Transactions of this Society, vol. 37 (1935), p. 18). (Received July 23, 1938.)

348. Dunham Jackson: *A class of orthogonal functions on plane curves.*

The notion of a system of polynomials in one variable orthogonal with respect to an arbitrary weight function is modified and, in a sense, generalized by substitution of trigonometric sums for the polynomials. Another generalization results from the consideration of polynomials in two variables orthogonal with respect to integration along an algebraic curve in the plane of the variables. These two ideas are combined in the present paper to define a still broader class of orthogonal functions, in the study of which attention is given both to formal properties and to questions of convergence of the resulting developments in series. The theory is simpler when the transition from polynomials to trigonometric sums is made with respect to just one of the variables than when the polynomials in two variables are replaced by double trigonometric sums. (Received July 23, 1938.)

349. Erich Kamke: *A new proof of Sturm's comparison theorems.*

The purpose of this paper is to develop a simple proof of Sturm's comparison theorems concerning the zeros of the solutions of differential equations. It is desired to compare the solutions of two systems each of which consists of a pair of first order

linear homogeneous differential equations with variable coefficients. A transformation to polar coordinates produces two new systems which are readily compared. The inequalities thus obtained can now be interpreted in terms of the original systems. This device yields the desired comparisons between the locations of the roots and between the numbers of the roots of the original systems. (Received July 29, 1938.)

350. D. H. Lehmer: *Semiregular continued cotangents.*

This paper is an extension of a previous investigation of a cotangent analog of continued fractions (Duke Mathematical Journal, vol. 4, pp. 323–340). It is concerned with expansions of the type $x=\cot \sum_{\nu=0} \alpha_\nu \operatorname{arc\,cot} n_\nu$, in which $\alpha_\nu^2=1$, the numbers $n_\nu$ are positive integers satisfying certain inequalities (to insure uniqueness when the $\alpha$'s are prescribed), and the series may be finite or infinite. Such an expansion is called a semiregular continued cotangent. In case $\alpha_\nu=(-1)^\nu$, the expansion becomes the regular continued cotangent previously considered. Analogs are obtained of most of the known theorems for semiregular continued fractions, except those having to do with the periodicity of the partial quotients. For example, by choosing different $\alpha$'s and $n$'s, it is possible to obtain not more than $Q$ different semiregular continued cotangent expansions of a fixed rational number $x=P/Q$. The extreme rapidity of convergence of the regular continued cotangent is also a feature of the semiregular case. (Received July 26, 1938.)

351. Walter Leighton and W. T. Scott: *A general continued fraction expansion.*

The general expansion of a power series into a continued fraction of the form $1+K[a_i x^{c_i}/1]$ is discussed. A typical theorem is the following: A necessary and sufficient condition that a continued fraction of the above form converge uniformly in an open region $T$ containing the origin to the analytic function $f(x)$ generating the continued fraction is that the $n$th approximant $A_n(x)/B_n(x)$ be uniformly bounded in $T$ for $n$ sufficiently large. (Received July 20, 1938.)

352. Howard Levi: *Prime and composite polynomials with coefficients in any infinite field.*

Composite polynomials with complex coefficients were treated by J. F. Ritt (Transactions of this Society, vol. 23 (1922), pp. 51–66). By function-theoretic methods, he analyzed the decompositions of composite polynomials into prime polynomials, obtaining extremely precise results. In the present paper, many of his results are derived for the case of polynomials with coefficients in an arbitrary field of characteristic zero. (Received July 28, 1938.)

353. R. G. Lubben: *The extension of homeomorphisms of normal spaces to topologically related spaces.*

Let $S$ be a normal space. In abstracts 43-9-344 and 44-1-32, this Bulletin, the author discussed spaces whose points are composition points of $S$, amalgamation points of $S$, portions of $S$, and those which serve as fields for extensions of various topological properties of $S$. In this paper, it is shown that the elements of a certain class $E(S)$ of these spaces are universal spaces relative to the problem of extending the elements of the group $G(S)$ of all homeomorphisms of $S$ into itself. If $T \in E(S)$, there exists a group $G(T)$ of homeomorphisms of $T$ into itself such that each element $f$ of $G(T)$ is an extension, which satisfies certain simple and important conditions, of an

element $f_T$ of $G(S)$, and such that the pairing of $f_T$ and $f$ determines a simple isomorphism of $G(S)$ and $G(T)$. Similar results hold for sets of homeomorphisms between two normal spaces. (Received July 25, 1938.)

354. W. H. McEwen: *On the degree of convergence of the derivatives of the Birkhoff series.*

Let $S_N(x)$ be the $N$th order partial sum of the Birkhoff series associated with a given function $f(x)$ and a given regular $n$th order linear differential system $L(u)+\lambda u=0$, $W_j(u)=0$, defined on (0, 1). Milne (Transactions of this Society, vol. 19 (1918), pp. 143–156) has shown that if $f, f', \cdots, f^{(m-1)}$ vanish at 0 and 1, and if $f^{(m)}$ is continuous and of limited variation on (0, 1), then $f-S_N=O(N^{-m})$ uniformly on (0, 1). The purpose of the present paper is to show that, under the same hypotheses, $f^{(k)}-S_N^{(k)}=O(N^{-m+k})$ uniformly on (0, 1), with $k=0, 1, \cdots, m-1$, and also, for a restricted class of problems in which $f, f', \cdots, f^{(m-1)}$ vanish at 0 and 1 and $f^{(m-1)}$ satisfies a Lipschitz condition with parameter $\mu$, that $|f^{(k)}-S_N^{(k)}| \leq K\mu \log N/N^{m-k}$, where $K$ is a constant independent of $N$, $k$. (Received July 20, 1938.)

355. J. K. L. MacDonald: *A note on Sturm-Liouville expansions and interpolations.*

Series of proper function solutions of Sturm-Liouville differential equations with two-signed coefficients are examined from the viewpoint of nodes and interpolation. It is proved that if the negative-proper-value expansion coefficients are not all zero, then the non-negative-proper-value expansion coefficients cannot all be zero for a piecewise continuous integrable function having a finite number of changes in sign in a certain interval and having the value zero elsewhere. (Received July 25, 1938.)

356. J. K. L. MacDonald: *On singularities and solutions of linear ordinary differential equations.*

Existence and comparison theorems and transformations are developed for use in determining the forms of solutions near singularities, in particular for second order linear ordinary differential equations. Simple integrability conditions for the coefficients permit classification of solutions, and the solutions are expressible through convergent iteration. (Received July 25, 1938.)

357. Robert MacKay: *Planarity of Peano spaces in terms of homology bases.*

A combinatorial condition for planar graphs was given by MacLane in terms of a basis of 1-circuits. It is the purpose of this paper to give a characterization of planar Peano spaces from the same point of view. It is first shown that a Peano continuum has a homology basis of simple closed curves whose diameters form a null sequence. By the use of such a null basis, a Peano space $P$ may be made simply 1-connected in the sense of homology by the addition of a denumerable set $Q$ of non-intersecting open 2-cells. Two 1-cycles $Z_1, Z_2$ of $P$ with carriers $C_1, C_2$, respectively, are then called *partially dependent* relative to the above basis if there exist in $P+Q$ two irreducible membranes $K_1$, $K_2$ relative to $Z_1$, $Z_2$, respectively, such that $C_1 \cdot C_2 \neq K_1 \cdot K_2$ and $K_1 \neq K_1 \cdot K_2 \neq K_2$. Planarity is determined chiefly in terms of partial dependence of 1-cycles; for example, a necessary and sufficient condition that a cyclic Peano continuum be planar is that it have a null basis such that no two simple closed curves with only a connected set in common are partially dependent relative to this basis. (Received July 25, 1938.)

358. Saunders MacLane: *The structure of automorphism groups of p-adic fields.*

The theorem of Hasse and Schmidt that the structure of a discrete perfect field is determined by the structure of its residue-class field is here given a new proof based upon a simple construction of such perfect fields, not requiring the Witt vector analysis. If a $p$-adic field $k$ has two $p$-adic extensions $K_1$ and $K_2$ with the same residue-class field $\mathfrak{K}$, then $K_1$ and $K_2$ are equivalent over $k$ if some $p$-basis of the smaller residue-class field $\mathfrak{k}$ is $p$-independent in $\mathfrak{K}$. This includes the case when $\mathfrak{K}$ has a separating transcendence base over $\mathfrak{k}$. The group $G$ of all analytic automorphisms of a $p$-adic field $K$ has an inertial subgroup $G_1$ and certain ramification subgroups $G_2 \supset G_3 \supset \cdots$. The quotient group $G/G_1$ is isomorphic to the automorphism group of the residue-class field $\mathfrak{K}$, while the quotient groups $G_n/G_{n+1}$ are abelian and representable as direct sums of the additive group $\mathfrak{K}$, the number of summands being the degree of imperfection of $\mathfrak{K}$. Finally, the subfield of $K$ left elementwise fixed by $G_1$ is the uniquely determined $p$-adic subfield of $K$ whose residue-class field is the maximal perfect subfield of the residue-class field $\mathfrak{K}$. (Received July 9, 1938.)

359. G. M. Merriman: *Concerning sets of polynomials orthogonal simultaneously on several ellipses.*

In a previous paper (this Bulletin, abstract 42-7-279), the author announced two results: (1) if a set of polynomials in the complex variable is orthogonal (with respect to a suitably chosen norm function) simultaneously on two or more concentric circles, then the set is orthogonal on all circles concentric with these (that is, on all "level curves" of the family); (2) an analogous proposition is true if the circles are replaced by confocal ellipses. The former result has recently been published (this Bulletin, vol. 44 (1938), pp. 57–69); the latter proposition is false. In the present paper, this second question is again treated. It is found that the hypothesis of orthogonality, with respect to a suitable norm function, simultaneously on a finite number (greater than unity) of confocal ellipses is not sufficient to induce orthogonality simultaneously on all level curves of the family; but that a hypothesis of orthogonality simultaneously on a denumerable infinity of confocal ellipses is sufficient. Thus, there may exist sets of polynomials orthogonal simultaneously on and only on a given finite number of confocal ellipses, in contrast to the case of orthogonality on circles. (Received July 27, 1938.)

360. Marston Morse: *A solution of the problem of infinite play in chess.*

The rules of chess include a description of admissible moves, together with rules which define a victory or a draw. Among the latter rules is one which proclaims a draw if any given sequence of moves is repeated twice in succession and is immediately followed by the first move of a third repetition. The question at issue is that of the possibility of an *unending* game of chess, that is a game which never leads to a victory or a draw. One of the conditions on the game is that it never lead to an undisputed superiority of one side, for in such a case the game is ordinarily required to end in a prescribed number of moves, or else become a draw. An unending sequence of symbols, first used by the author to establish the existence of recurrent motions in dynamics, is here used to establish the possibility of infinite play in chess. (Received July 9, 1938.)

361. David Moskovitz and L. L. Dines: *On convexity in a linear space with an inner product.*

In euclidean space of $n$ dimensions (1) if a point set is *linearly connected*, it is *completely supported at its boundary points*; and (2) if a set is closed, possesses inner points, and is completely supported at its boundary points, it is linearly connected (American Mathematical Monthly, vol. 45 (1938), p. 202). This paper investigates the extent to which the validity of these theorems persists in a general linear space in which the notions distance, convergence, and hyperplane are defined in terms of a generalized inner product. It is found that (2) is valid; but (1) is not valid without qualifications. The necessary qualifications are determined and expressed in several different forms. (Received July 26, 1938.)

362. Tadasi Nakayama: *On symmetric algebras and Galois moduli over modular fields.*

Let $A$ be a symmetric algebra (cf. R. Brauer and C. Nesbitt, Proceedings of the National Academy of Sciences, vol. 23; Nakayama and Nesbitt, this Bulletin, vol. 44 (1938), p. 346), and let $r(S)$ and $l(S)$ denote respectively the right and the left ideal of $A$ consisting of all right and left annihilators of a set $S$ of elements in $A$. If $L$ is a left ideal of $A$, then $l(r(L))=L$, and moreover, if $L_1$ is a left subideal of $L$, then the representation of $A$ defined by $L/L_1$ is equivalent to the one defined by $r(L_1)/r(L)$. Furthermore, the representations of $A$ defined by $Ac$ and $cA$ are equivalent to each other, where $c$ is any element of $A$. The proof begins with a general consideration concerning left and right representation moduli of an algebra which define equivalent representations. As an application of the theorem, M. Deuring's theorem on Galois moduli can be proved (Mathematische Annalen, vol. 113, §3) without the assumption of semi-simplicity of group algebras under consideration. (Received July 23, 1938.)

363. E. N. Oberg: *The approximate solution of certain linear functional equations.*

Let $T(u)=x(x)-\lambda U(u)=f(x)$ be a linear functional equation having a unique solution $u(x)$, and let $\Phi_n(x)$ be a linear combination of a set of $n+1$ linearly independent functions $\{\phi_n\}$. The present paper is concerned with the approximate representation of the solution of the equation $T(u)=f(x)$ by means of a function $\Phi_n(x)$ which is defined so that the integral of the $m$th power of $|f(x)-T(\Phi_n)|$ shall be the least. The problems involved center around the existence and uniqueness of such an approximating function for arbitrary values of $n$, and its convergence as $n$ becomes infinite. These problems are made to depend upon the class and properties of the function $u(x)$, $f(x)$, the transformation $U(u)$, and the set $\{\phi_n\}$. Analogous problems of this nature have been reported upon by the author and others in previous papers, but none have reached the generality of the present discussion. (Received July 20, 1938.)

364. R. E. O'Connor and Gordon Pall: *The quaternion congruence* $\bar{l}at\equiv b \pmod{g}$.

This paper includes and extends that of abstract 43-9-371. The congruence $\bar{l}at\equiv b\ (p^n)$ is solvable, in case $p\nmid Na$ and $p\nmid b$, if and only if the norm condition $Na(Nt)^2\equiv Nb\ (p^n)$ is solvable for $Nt$; and, if $p\mid Na$ but $p\nmid a$ and $b$, if and only if in addition the congruence is solvable for $n=1$ (discussed in abstract 43-9-371). There are equally many solutions $t$ with $Nt$ in any residue class (mod $p^n$) consistent with the norm condition. This is unlike the case of modulus $2^n$ (abstract 43-7-303), where

all solutions satisfy one and only one of $Nt \equiv 1$ or $-1 \pmod 4$. The symbol $\epsilon(a, b)$ is set equal to 1 or $-1$ according as $Nt \equiv 1$ or $-1$ (4); $[a, b]_p = 1$ or $-1$ according as $\overline{tat} \equiv b$ $(p)$ is solvable or not. If $a$ and $b$ are of the same norm $h$, the product of the values $[a, b]_p$ for the odd primes dividing $h$ is equal to $\epsilon(a, b)$. Properties of these symbols are developed and a simple generalization is obtained of the theorem of abstract 43-7-303 concerning $h(8n+1) = x_1^2 + x_2^2 + x_3^2$. Other applications involve the Legendre symbol $(a_1b_1 + a_2b_2 + a_3b_3 \mid p)$. (Received July 18, 1938.)

365. Rufus Oldenburger: *On decomposition of elements in abelian groups.*

To treat the decomposability of an element of an abelian group $G$ into a product of a given number of distinct elements of $G$, it is necessary only to distinguish between the unit element $I$, the idempotent elements different from $I$, and the non-idempotent elements of $G$. If $G$ has two or more idempotent elements, these elements form a subgroup $G'$ of $G$. Making use of pairs of elements of $G$ whose products equal idempotent elements, one can prove that a non-idempotent element can be decomposed into a product of $n$ distinct elements of $G$ provided that $n$ is less than the order of $G$. An idempotent element different from $I$ can be so decomposed unless $n$ is the order of $G$ and the order of the subgroup $G'$ of $G$ is greater than two. Like conditions hold for the decomposability of $I$ which depend only on $n$, and the orders of $G$, $G'$. These results have applications in the theory of forms. (Received July 26, 1938.)

366. A. J. Palermo: *Asymptotic expansions for certain Bessel functions.*

Certain convergent series converge rather rapidly when the argument is of relatively low value; but if the argument takes on high values, the convergence of these series is so slow as to entail prohibitively laborious, if not practically impossible, mathematical drudgery. In the present paper, a number of such series are transformed into asymptotic series in which the summation is very simple for high values of the argument. (The concise character of the paper fosters brevity and also permits the reader to try some of his own ingenuity on the transformations.) The author has applied the results of the present paper to high frequency phenomena. (Received July 25, 1938.)

367. Gordon Pall: *On the factorization of generalized quaternions.*

Quaternions are treated whose norm form is $Q = t_0^2 + F(t_1, t_2, t_3)$, where $F$ is the adjoint of a ternary form $\sum a_{\alpha\beta} x_\alpha x_\beta$. If the $a_{\alpha\beta}$ are integers, consider the ring of integral quaternions $t = t_0 + i_1 t_1 + i_2 t_2 + i_3 t_3$ with rational integer coefficient $t_i$. If $v = ut$ in integer quaternions, $t$ is called a right-divisor of $v$; necessarily, $Nt \mid Nv$. Let $p$ be an odd prime dividing $Nv$, but not $|a_{\alpha\beta}|$, nor all of $v_0, \cdots, v_3$; no right-divisor of $v$ having norm $p$ exists unless $p$ is consistent with the genus of $Q$; if it is so consistent, each right-divisor is connected with the representations of the number 1 in a certain quaternary quadratic class in the same genus as $Q$; if this genus contains but one class, the number of right-divisors is equal to the number of units (solutions of $Q = 1$). A partial extension is made to divisors of composite norm. (Received July 18, 1938.)

368. T. P. Palmer: *Procedural rules in the propositional calculus.*

A system is deduced from one postulate ($DDpDqrDDDsrDDpsDpsDpDpq$, suggested by Wajsberg in 1927) by means of four rules of procedure, two of which are parts of the usual blanket rule of substitution, and two of which are parts of the usual

blanket rule of inference. The equivalence of this system to the propositional calculus of *Principia Mathematica* is shown by introducing the familiar definitions of the operators of *Principia Mathematica* in terms of the operator $D$, and by proving that any substitution or inference performable by the rules of *Principia Mathematica* is performable in this system. The originality of this paper lies in the restriction of the procedural rules to a minimum. This restriction makes possible the complete avoidance of any reference to significance or meaningfulness of expressions. Wajsberg's postulate was used rather than that of Nicod or of Łukasiewicz because of the better phrasing of the rules of inference which it made possible. (Received July 26, 1938.)

369. G. B. Price: *Definitions and properties of monotone functions.*

Let $x(t)$ be a function defined on a general range with values in an abstract space. We say $x(t)$ is monotone if and only if $x(t_2)$ is between $x(t_1)$ and $x(t_3)$ whenever $t_2$ is between $t_1$ and $t_3$. In this paper, monotone functions defined in this manner in terms of the notion of betweenness are studied. Four definitions of betweenness are employed, one in partially ordered spaces, two in metric spaces, and one in linear spaces. For real-valued functions of a single variable, each type of monotoneity reduces to ordinary monotoneity. The discontinuities of the various types of monotone functions are determined, and the relation of monotone functions to functions of bounded variation is examined. The paper ends with a detailed study of a new class of real-valued monotone functions of two variables. A complete analysis of the nature and distribution of the points of discontinuity of these functions is given. These monotone functions form a subclass of the monotonic functions of Lebesgue and McShane. (Received July 23, 1938.)

370. H. A. Rademacher: *Some further problems of partitions.*

Hardy and Ramanujan (1917) in their paper on $p(n)$ mentioned also asymptotic formulas for the numbers $q(n)$ and $q_0(n)$ of partitions of $n$ into odd integers with and without repetition, respectively. They gave only the first few terms of the asymptotic formulas which close with error terms $O(1)$. The generating functions of $q(n)$ and $q_0(n)$ are essentially modular forms of dimension zero ("modular functions" in the strict sense), belonging to congruence subgroups modulo 2 and modulo 4 of the modular group. The method which the author applied to the coefficients of the modular function $J(\tau)$ (American Journal of Mathematics, vol. 60 (1938), pp. 501–512) leads to convergent series for $q(n)$ and $q_0(n)$. (Received July 26, 1938.)

371. W. T. Reid: *Some remarks on linear differential systems.*

Bliss (Transactions of this Society, vol. 28 (1926), pp. 561–584; see also abstract 42-5-156) has considered self-adjoint and definitely self-adjoint systems of ordinary linear differential equations of the first order, with two-point boundary conditions, for which the coefficients are real. In this note, linear differential systems with complex-valued coefficients are considered and so-called self-conjugate adjoint and definitely self-conjugate adjoint systems are defined. It is shown that definitely self-conjugate adjoint systems have only real characteristic values, and that such a system may be reduced to a definitely self-adjoint system with real coefficients. An associated matrix differential equation is solved, and the question of self-conjugate adjointness is reduced to the determination of a non-singular constant matrix of a certain type. Finally, there is given an application of this matrix differential equation to the theory of matrix differential equations of Riccati type. (Received July 26, 1938.)

372. D. Riabouchinsky: *Galileo's antinomy and the class of numbers defined by their value and origin.*

Galileo's and Cantor's ideas on infinite sets are discussed. (See E. Kasner, *Galileo and the modern concept of infinity*, this Bulletin, vol. 11 (1904), pp. 499–501.) To follow the development of any representation in the unlimited, one must first of all establish it strictly in the finite and only then project it into the infinite. Failing this precaution, one often encounters contradictions or indeterminate relations. The following topics are treated: geometrical interpretation of transfinite numbers; the origin of a number; the class of numbers defined by their value and origin; the operation of passing to the limit and the inverse operation of returning from the limit; applications of these concepts to the theory of sets. (Received July 26, 1938.)

373. H. E. Robbins: *On the classification of the mappings of a 2-complex into a space.*

Necessary and sufficient conditions are given for the homotopy of two mappings of a 2-complex into a space. The conditions are of a combinatorial character, involving chains with coefficients from the 2-dimensional homotopy group and fundamental group of the space. Such classification has been carried through previously only where the fundamental group or the higher dimensional homotopy groups of the space are assumed to vanish (Hopf, Hurewicz). The present work is closely related to recent (unpublished) work by Whitney, classifying mappings into projective spaces. (Received July 20, 1938.)

374. G. E. Schweigert: *Concerning non-alternating interior transformations.*

The space under consideration is a locally connected continuum $M$; any $A$-set in $M$ is denoted by $A$. It is shown that a non-alternating transformation $T(M)=N$ preserves $A$-sets; that is, $T(A)$ is also an $A$-set. Under the hypothesis that $T(M)=N$ is interior and non-alternating, it is established that $T^{-1}T(A)=A$ when $A$ and $N$ are non-degenerate. Implications concerning cyclic extensibility and reducibility of the non-alternating and interiority properties for a transformation follow this result immediately. Concerning an $A$-set $K$ in $N$, it is shown that there are but a finite number of components $C$ in $T^{-1}(K)$ and, when $T$ is a light transformation, that each $C$ is locally connected. Although not directly in line with the above results, a sufficient condition on $M$ in order that $T$ be topological is given. (Received July 22, 1938.)

375. Stephan Serghiesco: *On the subdivision of a mechanical system of corpuscules in equilibrium.*

The most recent theories of the mass of a particle, especially of the photon, include certain conceptions of the subdivision of this mass. In this paper, it is shown in general lines that it is possible to arrive at these conceptions of subdivisions of mass through a purely analytical mechanics method which is presented as a continuation of a special corpuscular theory of the author (Comptes Rendus (Paris), vol. 202 (1936), p. 1563 and p. 1761). As one cannot draw very advantageous conclusions about the mass of the photon from the relativity formula, a special theoretical expression for its mass, during a short interval of time, is given in this paper. (Received July 22, 1938.)

376. Max Shiffman: *The automorphisms of an abelian group.*

Let $A$ be a primary abelian group all of whose elements have a finite height; let $\sigma$ be the ring of all automorphisms of $A$. In this paper, a one-to-one correspondence is established between certain subgroups of $A$ and certain (two-sided) ideals of $\sigma$. A regular characteristic subgroup $R$ of $A$ is one such that $R\alpha = R$ or $R\alpha \subset R$ for all automorphisms $\alpha$ of $\sigma$. A right (left) characteristic ideal $c(c')$ of $\sigma$ is one such that there exists an ideal $i$ for which $i \cdot c = 0$, and $i \cdot d = 0$ implies $d = c$ or $d \subset c$ ($c' \cdot i = 0$, and $d \cdot i = 0$ implies $d = c'$ or $d \subset c'$). The one-to-one correspondence is between regular characteristic subgroups and right (left) characteristic ideals. To $R$ corresponds the right characteristic ideal $u(R)$ which is the totality of automorphisms $\alpha$ such that $R\alpha = 0$. To $c$ corresponds the regular characteristic subgroup $r(c)$ which is the totality of elements $r$ such that $rc = 0$. It is shown that the correspondences $u(R)$, $r(c)$ are inverse to one another, $r[u(R)] = R$, $u[r(c)] = c$. Similar correspondences can be established between the regular characteristic subgroups $R$ and the left characteristic ideals $c'$. (Received July 26, 1938.)

377. Max Shiffman: *The Plateau problem for minimal surfaces which are not relative minima.*

In this paper it is proved that a curve $\Gamma$ which bounds two minimal surfaces which are relative minima also bounds a minimal surface which is not a relative minimum. Let $\gamma_1$, $\gamma_2$ be the two minimal surfaces which are relative minima, and consider the space of all surfaces bounded by $\Gamma$. Let $S$ be any connected set of surfaces containing $\gamma_1$ and $\gamma_2$, and let $d(S)$ be the least upper bound of the Dirichlet function $D(\gamma)$ for all $\gamma$ belonging to $S$. Let $d$ be the greatest lower bound of $d(S)$ for all such $S$. It is first shown that $d$ is attained for some $S$. It is then shown that on $S$ there is a minimal surface $\gamma$ which is not a relative minimum and for which $D(\gamma) = d$. If this were not so, a deformation of $S$ into $S'$ could be defined for which $d(S') < d$, contrary to the definition of $d$. The method is applicable to the most general case of several boundaries and higher topological structures. Furthermore, it permits the application of the Morse theory to the Plateau problem. (Received July 26, 1938.)

378. C. D. Smith: *Three-circle problems in modern geometry.*

The radical axes of a system of three circles meet in a point called the radical center. If three circles have a point $P$ in common, $P$ is the radical center of this system. Let the circles meet again two by two at $A_1$, $B_1$, $C_1$, so that angles $A_1PC_1$, $C_1PB_1$, $B_1PA_1$ are each less than a straight angle. Inscribe a quadrilateral $A_1PC_1B$ in circle $A_1PC_1$ with $B$ restricted to arc $A_1BC_1$. In like manner for each of the other two circles draw inscribed quadrilaterals $C_1PB_1A$ and $B_1PA_1C$. The following fundamental theorem is proved: The three inscribed angles opposite the radical center are together equal to a straight angle. The theorem of Miquel for a triangle is a special case of this theorem. The theorems of Ceva and Menelaus, the Simson line, the Lemoine point, the Gergonne point, the Nagel point, and the Brocard points are demonstrated as special cases of the three-circle theorem. The following new results are obtained: a Miquel correspondence between points of the plane, the Miquel line of a triangle with the Simson line as a special case, and other interesting theorems. The geometry of the notable points of the triangle is connected and the proofs simplified by this method. (Received July 5, 1938.)

379. H. S. Thurston: *On the number of sets conjugate to a matrix with linear elementary divisors.*

Any $n$-rowed matrix $M$ having only linear elementary divisors is expressible as a polynomial in a matrix $A$ with simple latent roots. If $M$ possesses $r$ distinct latent roots, then $M$ has, in the ring $R(A)$, $[(r-1)!]^{n-1}$ sets of conjugates with respect to its minimum equation, the matrices of $[(r-1)!]^{r-1}$ of these sets being expressible as integral rational functions of $M$. (Received July 23, 1938.)

380. H. S. Thurston: *On factoring a matric polynomial with scalar coefficients.*

The following theorem is proved: If $\mu$ is the number of characteristic values of a square matrix $A$, then any polynomial of degree $t$, with simple zeros, breaks up in $(t!)^{\mu-1}$ ways into a product of $t$ linear factors in the ring $R(A)$. Two conjugate sets $G=\{X_0, X_1, \cdots, X_{t-1}\}$ and $H=\{Y_0, Y_1, \cdots, Y_{t-1}\}$, obtained from distinct factorizations, are called *similar* if there exists a non-singular matrix $T$ such that $Y_i=T^{-1}X_iT$, the same $T$ serving for every $i$. A sufficient condition for the existence of similar sets is that the matrix $A$ have a Segre characteristic of the form $[k\ k\cdots k]$. (Received July 23, 1938.)

381. Esther M. Torrance: *Superposition on monotonic functions.* II.

Let $y=g(x)$ be a monotonic function. A necessary and sufficient condition that $f[g(x)]$ be measurable for every measurable function $f(y)$ is that the inverse monotonic function $x=g^{-1}(y)$ be absolutely continuous on the $G_\delta'$ over which the function defines a homeomorphism. If $f(y)$ is a Baire function of class $\alpha$, $(\alpha>1)$, then $f[g(x)]$ and $f[g^{-1}(x)]$ are Baire functions of class $\alpha$. (Received July 25, 1938.)

382. W. J. Trjitzinsky: *Theory of non-linear q-difference equations.*

In this paper the analytic (asymptotic) theory of equations of the indicated type is developed. At the basis of the work lies the theory of linear $q$-difference equations as developed by the author (Acta Mathematica, 1933, pp. 1–38). Use is made of a method, due to the author, specifically applicable to a type of non-linear problems and previously employed by him in the fields of differential and difference equations (see Transactions of this Society, vol. 42 (1937), pp. 225–321; Compositio Mathematica, 1937, pp. 1–66; Mémorial des Sciences Mathématiques, no. 90, 1938). (Received July 15, 1938.)

383. A. H. Wheeler: *Groups of cubes and groups of regular tetrahedra inscriptible in a cube.*

In this paper it is shown that in a given cube there can be inscribed an infinite number of groups of six equal cubes each, all of which are concentric with it. Furthermore, there can be inscribed an infinite number of groups of twelve equal cubes each, and these twelve cubes are not concentric one with another, or with the given cube. Two congruent regular tetrahedra can be inscribed in a cube with their vertices at the vertices of the cube. Accordingly, there can be inscribed in a given cube an infinite number of groups of twelve congruent, regular tetrahedra each; and these tetrahedra are concentric, one with another, and with the given cube. There can also be inscribed in a given cube, an infinite number of groups of twenty-four congruent, regular tetrahedra each; and these tetrahedra are not concentric, one with another, or with the given cube. (Received July 19, 1938.)

384. Margarete C. Wolf and Louise A. Wolf: *The linear equation in matrices with elements in a division algebra.*

To determine necessary and sufficient conditions for the existence of solutions of the equations $\sum_{k=1}^{m} A_k X B_k = C$ in $r \times r$ matrices and to determine the number of solutions, each matrix $M$ may be written as $\sum_{i=1}^{n} u_i M^{(i)}$, where the $u_i$, $(i=1, 2, \cdots, n)$, are the basis of the algebra and the $M^{(i)}$ are matrices with elements in the centrum. This reduces the problem to solving $nr^2$ linear equations in $nr^2$ elements whose coefficients are in the centrum. The matrix of the coefficients of this system of equations can be expressed as a sum of direct products of matrices whose elements are in the centrum. For $AX = I$ this matrix of the coefficients can be written as $\sum_{i=1}^{n} R^{(i)} \cdot xA^{(i)} \cdot xI_r$, where $I_r$ is the $r \times r$ identity, $R^{(i)}$, $(i=1, 2, \cdots, n)$, is the $n \times n$ first matric representation of $u_i$, and $A = \sum_{i=1}^{n} u_i A^{(i)}$. A necessary and sufficient condition that $AX = I$ have a unique solution is that $\left| \sum_{i=1}^{n} R^{(i)} \cdot xA^{(i)} \right| \neq 0$, which may also be obtained by other methods. To study the equation $XA = I$, it is more convenient to use the second matric representation of the basal elements. (If the algebra is a field, see C. C. MacDuffee, *The Theory of Matrices.*) (Received July 25, 1938.)

385. R. P. Agnew: *On cores of bounded divergent complex sequences and of their transforms by square matrices.*

This paper characterizes matrices $\|a_{nk}\|$ of complex constants such that the transform $\sigma_n = \sum_{k=1}^{\infty} a_{nk} s_k$ of each real bounded divergent sequence $s_n$ has a core $\Gamma$ which is a nonempty subset of the core $C$ of $s_n$. The same problem is solved for the class of complex bounded divergent sequences $s_n$. Analogous problems are solved for sequence-to-function transformations $\sigma(t) = \sum_{k=1}^{\infty} a_k(t) s_k$. (Received August 9, 1938.)

386. G. E. Albert: *Asymptotic forms for a general class of hypergeometric functions with applications to the generalized Legendre functions.*

The developments reported in abstract 44-7-288 have been extended to the solutions of the differential equation $(1-z^2)y'' + [\beta - \alpha - (\alpha+\beta+2)z]y' + n(n+\alpha+\beta+1)y = 0$. Solutions are developed asymptotically relative to $n$ and $z$ which are uniform in $\alpha$ and $\beta$ in any fixed bounded domain. The results of the previous abstract are special cases; in addition, the Jacobi, Gegenbauer, and ultraspherical functions are included. (Received August 19, 1938.)

387. Henry Blumberg: *On the general point transformation.*

The author considers transformations $X' = f(X)$ of the points $X$ of a euclidean $n$-space $E$ into the points $X'$ of a euclidean $n$-space $E'$, $f$ unconditioned except to be "one-valued" which, however, is not essential. Various theorems are proved stating properties which $f$ has at every point of $E$ if certain sets are disregarded. Such types of negligible sets are the denumerable, the exhaustible, the *sparse* set (sparse equals ridé of W. H. Young, see author's forthcoming paper, *Exceptional sets*, in Fundamenta Mathematicae), and the set of zero measure. Notably, an analog is derived of the central theorem in the author's paper, *The measurable boundaries of an arbitrary function* (Acta Mathematica, vol. 65 (1935), p. 263). Generalizations are obtained. (Received August 20, 1938.)

388. Jesse Douglas: *A Jordan space curve having the infinite area property at each of its points.*

This paper appears in full in the Proceedings of the National Academy of Sciences, September, 1938. (Received July 29, 1938.)

389. Jesse Douglas: *The problem of Plateau.*

This paper, giving an exposition in as nontechnical a style as seems possible of some of the essential features of the author's work of the last twelve years on the problem of Plateau, is published in Scripta Mathematica, July, 1938. (Received July 29, 1938.)

390. Jesse Douglas: *Geometry of polygons in the complex plane.*

If, on each side of any given triangle as base, an isosceles triangle with 120° vertex-angle is constructed (always outward or always inward), then the vertices of these isosceles triangles form an equilateral triangle. This theorem of elementary geometry is here generalized by simple linear algebraic calculations to polygons of $n$ sides, supposed to lie in the complex plane. Definitions: (i) An $n$-gon $\Pi$ is a system of $n$ points in a given cyclic order $(P_1, P_2, \cdots, P_n)$. (ii) The construction $S_a$ ($a$ any complex number) means the formation from $\Pi$ of the $n$-gon $\Pi' = (P_1', P_2', \cdots, P_n')$, where each triangle $P_kP_{k+1}P_k'$ is directly similar to $(a, 1, 0)$. (iii) A regular $n$-gon of $\omega^p$-type, $(\omega = e^{2\pi i/n})$, is one directly similar to $(\omega^p, \omega^{2p}, \cdots, \omega^{np})$. Theorems: (I) If, starting with any $n$-gon $\Pi$, one performs successively, in any order, the $n-2$ operations $S_{\omega^m}$, $(m = 1, 2, \cdots, n-1$, except $n-p)$, so getting $\Pi', \Pi'', \cdots, \Pi^{(n-2)}$, then $\Pi^{(n-2)}$ is a regular $n$-gon of $\omega^p$-type, and identically the same one, including position, regardless of the order of the operations $S_{\omega^m}$. (II) If also $m = p$ is omitted, as well as $m = n-p$, then $\Pi^{(n-3)}$ is affinely equivalent to a regular polygon of $\omega^p$-type. (Received July 29, 1938.)

391. W. D. Duthie: *Pseudo-valuation for Boolean rings.*

The definitions of a pseudo-valuation for an arbitrary ring as given by Mahler (*Über Pseudobewertungen*, I, Acta Mathematica, vol. 36, pp. 79–119) and by Deuring (*Algebren*, Ergebnisse der Mathematik, vol. 4, no. 1), when applied to a Boolean ring, give rise to pseudo-valuations which are incapable of assuming any value between 0 and 1. It is the purpose of this note to point out a simple modification in the definitions cited which eliminates this difficulty and at the same time retains most, if not all, of the properties of the original definitions. The modified definitions are distinct in type. An example of each type is given. It is also shown that these definitions impose a relation on the pseudo-valuations of the ordered elements of the Boolean ring. (Received August 19, 1938.)

392. Edward Kasner and J. J. De Cicco: *Conformal geometry of horn angles of second order contact.*

The object of this paper is to develop the conformal geometry of a horn angle of second order contact. A horn-set $(\gamma)$ is defined as the totality of all curves (or fifth order differentiable elements) which pass through a given point in a common direction and which possess the same curvature $\gamma$. Let $x = d\gamma/ds$, $y = d^2\gamma/ds^2$, $z = d^3\gamma/ds^3$, where $\gamma$ is the curvature and $s$ is the arc length, of any curve $C$ of the horn-set $(\gamma)$ at the fixed point. A *linear series* is the totality of curves of a horn-set $(\gamma)$ which satisfy the two linear equations $y = px + r$, $z = qx + s$, where $p$, $q$, $r$, $s$ are constants. A *flat con-*

*gruence* is the totality of curves of a horn-set ($\gamma$) which satisfy the linear equation $z=ax+by+c$, where $a$, $b$, $c$ are constants. It is found that the group of conformal transformations induces a fundamental five-parameter group $G_5$ between the curves of a horn-set ($\gamma$) and the curves of a horn-set ($\Gamma$). Under $G_5$ it results that linear series are carried into linear series and flat congruences are converted into flat congruences. The elementary invariants between the curves, the linear series, and the flat congruences of a horn-set ($\gamma$) are obtained. (Received August 4, 1938.)

393. F. L. Lamoreau: *Temperature distribution in a long rectangular bar of two layers.*

The problem is that of finding the temperature distribution at any instant in a long rectangular bar composed of two layers, where each layer is of different material. The outer lateral surface of the bar is held at zero temperature, and the initial temperature distribution in a cross section of the two layers is arbitrarily given. The procedure is similar to that used by Churchill, (*Temperature distribution in a slab of two layers*, Duke Mathematical Journal, vol. 2 (1936), pp. 405–414) in solving the analogous one-dimensional problem. The treatment of the formal work has been simplified by the introduction of a bi-orthogonal set of functions. (Received August 19, 1938.)

394. K. W. Lamson: *Linear families of linear $S_2$-complexes in $S_5$.*

An $S_2$-complex in $S_5$ is given by the equation $a_{ijk}p^{ijk}=0$ wherein $p^{ijk}$ are the coordinates of an $S_2$. In this paper, the family $(\lambda a_{ijk}+\mu b_{ijk})p^{ijk}=0$ is studied. The following properties are found: in the general case, the family is determined by four arbitrary planes; if the invariant of the complex (of the fourth degree in $\lambda$, $\mu$) vanishes, the complex has a directrix; if two of the four directrices intersect, the other two also intersect. (Received August 13, 1938.)

395. A. N. Lowan: *On the computation of a certain infinite series.*

In a previous paper (*Cooling of a radioactive sphere*, Physical Review, vol. 44 (1933)), the author derived the formula $T(r,t)=2R^3/(\pi^2Kr)\cdot\sum_{s=1}^{\infty}(1-e^{-s^2c})(1/s^2)\sin\sin(2s\pi r/R)\int_0^R x\phi(Rx)\sin s\pi x\,dx$, for the contribution to the earth's temperature arising from radioactivity of the rocks. This series is very slowly convergent. However, if we write $T_1(r)=(2R^3/\pi^2Kr)\sum_{s=1}^{\infty}(1/s^2)\sin(s\pi r/R)\int_0^R x\phi(Rx)\sin s\pi x\,dx$, and $T_2(r,t)=(2R^3/\pi^2Kr)\sum_{s=1}^{\infty}e^{-s^2c}(1/s^2)\sin(s\pi r/R)\int_0^R x\phi(Rx)\sin s\pi x\,dx$, then $T(r,t)=T_1(r)-T_2(r,t)$. Here $T_1(r)$ represents the distribution of temperature corresponding to the steady state and is therefore a solution of the differential equation of heat conduction, in which the term $\partial/\partial t$ has been dropped; $T_1(r)$ is thus obtained in closed form suitable for computations. The convergence of $T_2(r,t)$ is considerably faster. Upper bounds for the remainder, when the series has been truncated after $n$ terms, are obtained (by replacing the infinite series representing the remainder by suitable definite integrals) for the case $\phi=Ae^{-a(R-r)}$ in the two alternative forms $|E(n,r)|<2C(d/r)[1-\mathrm{Erf}(nc^{1/2})]$ and $E(n,r)<C(R/r)[-Ei(-en^2)]$, wherein $C$ is a certain dimensional constant. On the basis of the last two expressions for the remainder, it is shown that $T(r,t)$ may be computed to a depth of 1800 miles by keeping not more than 25 terms in the infinite series representation of $T(r,t)$. (Received August 26, 1938.)

396. A. N. Lowan: *On wave motion for subinfinite domains.*

In a previous paper (*On wave motion with subinfinite domains*, to appear in the

Philosophical Magazine), the author investigated the integration of the system $S$: (I) $\nabla^2 u(P, t) = 2b\partial u(P, t)/\partial t + (1/a^2)\partial^2 u(P, t)/\partial t^2 + \Phi(P, t)$; (II) $\lim_{t\to 0} u(P) = f(P)$; (III) $\lim_{t\to 0} \partial u(P, t)/\partial t = g(P)$, for infinite domains of one, two, and three dimensions. In the present paper, (I) is integrated for the following domains and boundary conditions: (1) $0<x<\infty$, $u(0, t)=\phi(t)$; (2a) $0<x<\infty$, $-\infty<y<\infty$, $u(0, y, t)=\phi(y, t)$; (2b) $0<x<\infty$, $0<y<\infty$, $u(0, y, t)=\phi_1(y, t)$, $u_2(x, 0, t)=\phi_2(x, t)$; (3a) $0<x<\infty$, $-\infty<y<\infty$, $-\infty<z<\infty$, $u(0, y, z, t)=\phi(y, z, t)$; (3b) $0<x<\infty$, $0<y<\infty$, $-\infty<z<\infty$, $u(0, y, z, t)=\phi_1(y, z, t)$, $u(x, 0, y, t)=\phi_2(x, y, t)$; (3c) $0<x<\infty$, $0<y<\infty$, $0<z<\infty$, $u(0, y, z, t)=\phi_1(y, z, t)$, $u(x, 0, z, t)=\phi_2(x, z, t)$, $u(x, y, 0, t)=\phi_3(y, z, t)$. In all the above cases $U(P, t)=u(P, t)+v(P, t)$, $u(P, t)$ satisfies (I) and vanishes at the given boundaries, $v(P, t)$ satisfies the system $S'$ obtained from $S$ by putting $f=g=\phi=0$ and assumes the prescribed boundary conditions; $u(P, t)$ may be obtained from the corresponding solutions given in the previous paper by suitably extending the definitions of $f$, $g$, and $\phi$. The solutions $v(P, t)$ may be obtained by deriving the Laplace transform $v^*(P, p)$ and then reverting to $v(P, t)$. (Received August 23, 1938.)

397. L. A. MacColl: *Differential-geometric aspects of relativistic dynamics.*

Kasner has determined a set of five geometrical properties which characterizes the families of trajectories of a particle moving in a plane, according to the laws of Newtonian dynamics, under forces which are functions of position only (Transactions of this Society, vol. 7 (1906), pp. 401–424; also *Differential-geometric aspects of dynamics*, American Mathematical Society Colloquium Publications, vol. $3_2$, 1913, pp. 9–17). In the present paper, the modification of Kasner's problem which is obtained by assuming that the particle moves according to the laws of special relativistic dynamics is discussed. It is found that the families of trajectories can be characterized by a set of seven geometrical properties. Five of these resemble, in various degrees, the properties obtained by Kasner, while the remaining two properties have no classical analogs. (Received August 31, 1938.)

398. Dorothy Manning: *On simply transitive groups with transitive abelian subgroups of the same degree.* III.

A simply transitive group of degree $p_1^{\alpha_1} p_2^{\alpha_2} \cdots p_k^{\alpha_k}$ ($p_1, p_2, \cdots, p_k$ primes, not necessarily distinct, $k \geqq 2$) which contains a transitive abelian subgroup of the same degree generated by $k$ permutations of orders $p_1^{\alpha_1}, p_2^{\alpha_2}, \cdots, p_k^{\alpha_k}$, respectively, is imprimitive and compound when $p_1^{\alpha_1} > p_2^{\alpha_2} > \cdots > p_k^{\alpha_k}$. It may be primitive when $p_1^{\alpha_1} = p_2^{\alpha_2} = \cdots = p_k^{\alpha_k}$. (Received August 25, 1938.)

399. Kyrille Popoff: *Application des méthodes d'intégration de Poincaré à la balistique extérieure.*

Les méthodes d'intégration de Poincaré, établiés dans la *Mécanique Céleste*, s'appliquent aussi bien à l'étude du mouvement du centre de gravité du projectile sur la trajectoire qu'à l'étude du mouvement du projectile autour de son centre de gravité. La considération des intégrales des équations différentielles comme fonctions des paramètres figurant dans ces équations nous a permis de développer les intégrales du mouvement du centre de gravité du projectile en séries procédant suivant les puissances de $\sin^2 \phi/2$, où on a $\phi = \pi/2 + \alpha$ et où $\alpha$ est l'angle de projection. Nous étudions ensuite le rayon de convergence de ces séries et par une transformation

conforme nous arrivons à des séries convergentes dans un intervalle $(0, T)$ de temps, où $T$ est un nombre fini, choisi d'avance d'une manière arbitraire. Pour arriver à cela nous étudions d'abord les points singuliers des équations différentielles du mouvement et établissons l'existence des solutions asymptotiques à ces points et le caractère analytique de ces solutions. L'étude du mouvement de précession du projectile autour de son centre de gravité nous conduit à un système d'équations différentielles linéaires, que nous intégrons en formant soit les équations aux variations, soit en les réduisant à un système d'équations intégrales de Volterra. Nous établissons ainsi l'existance de solutions asymptotiques aux points singuliers de nos équations différentielles du mouvement de précession, et l'existence de solutions périodiques et de solutions asymptotiques à ces solutions périodiques. L'étude du mouvement de nutation se fait après suivant les mêmes principes. Le calcul des coefficients des séries que nous établissons se ramène a des quadratures. (Received August 29, 1938.)

400. Hillel Poritsky: *On algebraic equations whose roots lie in the negative half-plane.*

The tests of Routh, Hurwitz, and Schur are reviewed and deduced from Cauchy's theorem, and an extension of the Routh criterion to equations with complex coefficients is obtained. (Received September 6, 1938.)

401. J. H. Roberts: *A problem on acyclic continuous curves.*

The following theorem answers a question of O. H. Hamilton (Transactions of this Society, vol. 44 (1938), p. 24): If $M$ is any acyclic continuous curve, there exists a topological transformation $T$, other than the identity, which maps $M$ into a subset (not necessarily proper) of $M$. (Received August 15, 1938.)

402. J. H. Roberts: *Concerning homeomorphisms of the plane into itself.*

The following result has been obtained: The space of homeomorphisms of a plane $S$ into itself consists of exactly two arc-wise connected components. More precisely, if $\pi$ is any homeomorphism of $S$ into itself, there exists a homeomorphism $\pi_1$ of $S$ into itself which is either the identity or a reflection in the $y$-axis and a single-valued continuous function $f(p, t)$ defined over the range $p \in S$, $(0 \leq t \leq 1)$, with values in $S$, such that (1) for fixed $t$, $f(p, t)$ is a homeomorphism of $S$ into $S$, and (2) $f(p, 0) = \pi(p)$ and $f(p, 1) = \pi_1(p)$. (Received August 15, 1938.)

403. Louis Weisner: *Condition that a finite group be multiply isomorphic with each of its irreducible representations.*

The author proves the following theorem: A necessary and sufficient condition that a finite group $G$ be multiply isomorphic with each of its irreducible representations as a linear group is that $G$ contain a subgroup $P$ whose order is a power of a prime $p$, such that (1) $P$ is generated by the minimal invariant subgroups of $G$ whose orders are powers of $p$; and (2) every subgroup of index $p$ of $P$ contains an invariant subgroup of $G$ different from the identity group. (Received September 1, 1938.)

404. Louis Weisner: *The subgroup of order $n$ of a transitive group of degree $n$ and class $n-1$.*

It is well known that a transitive permutation group of degree $n$ and class $n-1$ contains an invariant subgroup of order $n$, composed of the identity and the permu-

tations of degree $n$. The author proves that this subgroup of order $n$ is an abelian group. (Received August 23, 1938.)

405. R. M. Robinson: *A generalization of Picard's and related theorems.*

According to Picard's theorem, a meromorphic function which leaves out more than two values is a constant. We shall say that $a$ is an exceptional value of order $m$ for $f(z)$ if the equation $f(z)=a$ has no root of multiplicity less than $m$ (where $m$ is a positive integer or $\infty$). To such an exceptional value we assign the weight $1-1/m$. A value which is never assumed by the function is an exceptional value of order $\infty$ and hence of weight 1. The generalization of Picard's theorem may then be stated: *A meromorphic function which admits exceptional values of total weight more than 2 is a constant.* Corresponding generalizations are made of the theorems of Landau, Schottky, Montel (criterion for normal family), and of the second Picard theorem. Of these, only the last is new; but the proofs given are simpler than those already known. The previous proofs depended on Nevanlinna's theory of meromorphic functions. The present proof is based on Ahlfors's recent generalization of Schwarz's lemma, which appeared in the May issue of the Transactions of this Society. (Received August 26, 1938.)

# NEW PUBLICATIONS

## PART I. PURE MATHEMATICS

ABRAMESCO (N.). Lectiuni de geometrie analitica. 2d edition. University of Cluj, 1937. 8+656 pp.

BAUDOIN (P.). Les ovales de Descartes et le limaçon de Pascal. Paris, Vuibert, 1938. 144 pp.

BERZOLARI (L.), VIVANTI (G.), and GIGLI (D.). Enciclopedia delle matematiche elementari. Volume 2, part 2. Milan, Hoepli, 1938. 574 pp.

BLAND (J. R.). See KERN (W. F.).

BLUMENTHAL (L. M.). Distance geometries. A study of the development of abstract metrics. (With an introduction by Karl Menger.) (The University of Missouri Studies, volume 13, no. 2.) Columbia, University of Missouri, 1938. 145 pp.

BROOKE (W. E.) and WILCOX (H. B.). Intermediate algebra. New York, Farrar and Rinehart, 1938. 8+323 pp.

BUHL (A.). Nouveaux éléments d'analyse. Volume 2: Calcul infinitésimal. Géométrie. Physique théorique. Paris, Gauthier-Villars, 1938. 6+216 pp.

CAMPBELL (A. D.). Advanced analytic geometry. New York, Wiley; London, Chapman and Hall, 1938. 10+310 pp.

CRANDALL (H.) and SEYMOUR (F. E.). General mathematics; a one-year course. New York, Heath, 1938. 7+389 pp.

DIJKSTERHUIS (E. J.). Archimedes. Volume 1. Groningen, Noordhoff, 1938. 8+213 pp.

DURELL (C. V.) and ROBSON (A.). Advanced algebra. Volumes 2, 3. London, Bell, 1937. 11+315+28 pp.

EMDE (F.). See JAHNKE (E.).

ESTÈVE (R.) and MITAULT (H.). Trigonométrie et compléments d'algèbre. Paris, Gauthier-Villars, 1937. 4+56 pp.

GIGLI (D.). See BERZOLARI (L.).

GINGRICH (R. F.). See SMUTZ (F. A.).

HARDY (J. G.). A short course in trigonometry. Revised. 9+152 pp. Logarithmic and trigonometric tables. Revised. 16+143 pp. New York, Macmillan, 1938.

HERMES (H.). Eine Axiomatisierung der allgemeinen Mechanik. (Forschungen zur Logik und zur Grundlegung der exakten Wissenschaften, volume 3.) Leipzig, Hirzel, 1938. 48 pp.

JAHNKE (E.) and EMDE (F.). Funktionentafeln mit Formeln und Kurven. 3d revised edition. Leipzig and Berlin, Teubner, 1938. 12+306 pp.

JENNE (W.). Kettenbruchformeln und Korrelatentabellen für trigonometrische Netze mit einigen Beiträgen zur Auflösung beliebiger Systeme einfacher linearer Gleichungen mit Hilfe von Kettenbrüchen. (New series, no. 107.) Potsdam, Preussische Geodätische Institut, 1937. 4+101 pp.

JOOS (G.) and KALUZA (Th.). Höhere Mathematik für den Praktiker. 5th edition of Lehrbuch der Differential- und Integralrechnung by H. A. Lorentz. Leipzig, Barth, 1938. 12+364 pp.

KALUZA (Th.). See JOOS (G.).

KERN (W. F.) and BLAND (J. R.). Solid mensuration. 2d edition. New York, Wiley; London, Chapman and Hall, 1938. 7+172 pp.

KLEE (R.). Über die einfachen Konfigurationen der euklidischen und der projektiven Ebene. Dresden, Focken and Oltmanns, 1938. 67 pp.

KNÖLL (L.). Krümmungsverhältnisse von Niveaulinien in der Kreisabbildung einfach zusammenhängender schlichter Gebiete. Giessen, Mathematisches Seminar, 1937. 53 pp.

LALESCO (T.). La géométrie du triangle. 2d edition. Paris, Vuibert, 1937. 8+120 pp.

LEMAIRE (J.). Exercices de géométrie moderne. Paris, Vuibert, 1937. 170 pp.

LORENTZ (H. A.). See Joos (G.).

LOVE (C. E.). Analytic geometry. 3d edition. New York, Macmillan, 1938. 14+279 pp.

MENGER (K.). See BLUMENTHAL (L. M.).

MITAULT (H.). See ESTÈVE (R.).

MORRIS (C. W.). Foundations of the theory of signs. (International Encyclopedia of Unified Science, volume 1, no. 2.) University of Chicago Press, 1938. 7+59 pp.

MOORE (C. N.). Summable series and convergence factors. (American Mathematical Society Colloquium Publications, volume 22.) New York, American Mathematical Society, 1938. 6+105 pp.

OTTO (F.). Die natürliche Geometrie und das geometrische Urgesetz. (Die Grundlehren der neuen Mathematik, Physik und Astronomie.) Berlin, Müller and Schröder, 1937. 32 pp.

POIRIER (R.). Le nombre. Paris, Alcan, 1938. 184 pp.

ROBSON (A.). See DURELL (C. V.).

SCHLEIER (E.). Mathematik. Leipzig, Jänecke, 1938. 3+230 pp.

SCHLENSNER (A.). Zur Konvergenz des Engesser-Vianello-Verfahrens. Paris, Hermann, 1937. 40 pp.

SEYMOUR (F. E.). See CRANDALL (H.).

SHABDE (N. G.). The general field theory of Schouten and Van Dantzig. (Lucknow University Studies, no. 10.) Allahabad, Law Journal Press, 1938. 4+58 pp.

SKOLEM (T.). Diophantische Gleichungen. (Ergebnisse der Mathematik und ihrer Grenzgebiete, volume 5, no. 4.) Berlin, Springer, 1938. 4+130 pp.

SMUTZ (F. A.) and GINGRICH (R. F.). Descriptive geometry. 2d edition. New York, Van Nostrand, 1938. 10+227 pp.

VIVANTI (G.). See BERZOLARI (L.).

WEATHERBURN (C. E.). An introduction to Riemannian geometry and the tensor calculus. Cambridge, University Press; New York, Macmillan, 1938. 10+191 pp.

WILCOX (H. B.). See BROOKE (W. E.).

## PART II. APPLIED MATHEMATICS

BAKST (A.). Approximate computation. New York, Columbia University Bureau of Publications, 1937. 16+287 pp.

BARRY (F.). See SPIERS (A. G. H.).

BOHR (N.). See NEURATH (O.).

BURKHARDT (F.). See CZUBER (E.).

CARNAP (R.). See NEURATH (O.).

CARTON (L.). Spectrographie de masse; les isotopes et leurs masses. (Actualités Scientifiques et Industrielles, no. 550.) Paris, Hermann, 1937. 91 pp.

CASPER (M.). See KEPLER (J.).

CASWELL (A. E.). An outline of physics. Revised edition. New York, Macmillan, 1938. 9+590 pp.

CZUBER (E.) and BURKHARDT (F.). Die statistischen Forschungsmethoden. 3d revised edition. Vienna, Seidel, 1938. 330 pp.

DE DONDER (T.). Théorie nouvelle de la mécanique statistique. (La Chimie Mathématique, volume 1.) Paris, Gauthier-Villars, 1938. 83 pp.

DEWEY (J.). See NEURATH (O.).

DREYER (G.). Festigkeitslehre und Elastizitätslehre: Lehrbuch für höhere technischen Lehranstalten und für den Selbstunterricht. 3d revised edition. (Statik und Festigkeit, volume 2.) Leipzig, Janecke, 1938. 150 pp.

FULFORD (R. J.). Higher papers in applied mathematics. London, Arnold, 1938. 143 pp.

HATSCHEK (P.). Optik des Unsichtbaren: eine Einführung in die Welt der Elektronenoptik. 2d edition. Stuttgart, Franck, 1938. 149 pp.

HOLMAN (L. J.). Simplified statistics. London, Pitman, 1938. 12+142 pp.

HUYGENS (C.). Oeuvres complètes. Volume 19: Mécanique théorique et physique de 1666 à 1695. Huygens à l'Académie royale des sciences. (Publiées par la Société hollandaise des sciences.) The Hague, Nijhoff, 1937. 688 pp.

KAGAN (B.). Mémoires du séminaire pour l'analyse vectorielle et tensorielle et pour ses applications à la géométrie, à la mécanique et à la physique. Moscow, 1937. 404 pp.

KAMMERLOHER (J.). Hochfrequenztechnik. Volume 1. (Lehrbücher der Feinwerktechnik, volume 1.) Leipzig, Winter, 1938. 199 pp.

KEPLER (J.). Gesammelte Werke. Volume 3: Astronomia Nova. Edited by M. CASPER. Munich, Becksche, 1937. 488 pp.

KLOTTER (K.). Einführung in die technische Schwingungslehre. Volume 1: Einfache Schwinger. Berlin, Springer, 1938. 8+206 pp.

LACROUTE (P.). Raies d'absorption dans les spectres stellaires. (Actualités Scientifiques et Industrielles, no. 473.) Paris, Hermann, 1937. 92 pp.

LORIA (G.). Galileo Galilei. Milan, Hoepli, 1938. 10+145 pp.

MASSEY (I. H. S. W.). Negative ions. New York, Cambridge University Press, 1938. 14+105 pp.

MORRIS (C. W.). See NEURATH (O.).

NEURATH (O.), BOHR (N.), DEWEY (J.), RUSSELL (B.), CARNAP (R.), and MORRIS (C. W.). Encyclopedia of unified science. (International Encyclopedia of Unified Science, volume 1, no. 1.) University of Chicago Press, 1938. 8+75 pp.

PIER (C.), Edited by. Das Grundgesetz des elektrischen Stromes. Drei Abhandlungen von G. S. Ohm (1825 und 1826) und G. T. Fechner (1829). (Ostwalds Klassiker der exakten Wissenschaften, no. 244.) Leipzig, Akademische Verlagsgesellschaft m.b.H., 1938. 45 pp.

RASHEVSKY (N.). Mathematical biophysics. Physicomathematical foundations of biology. University of Chicago Press, 1938. 18+340 pp.

RENAUD (P.). Analogies entre les principes de Carnot, Mayer et Curie. (Actualités Scientifiques et Industrielles, no. 516.) Paris, Hermann, 1937. 47 pp.

RINGSTROM (A. D.). The Ringstrom three dimensional systems of the atoms (with atomic musical pitches) and the theory of atomic integration. Chicago, Vega, 1938. 87 pp.

RUSSELL (B.). See NEURATH (O.).

SCHULTZ (H.). The theory and measurement of demand. University of Chicago Press, 1938. 31+817 pp.

SPEISER (A.). Ein Parmenideskommentar. Leipzig, Köhler, 1937. 64 pp.

SPIERS (A. G. H.) and SPIERS (I. H. B.), Translated by. The physical treatises of Pascal. (Introduction and notes by F. Barry.) New York, Columbia University Press, 1937. 28+184 pp.

SPIERS (I. H. B.). See SPIERS (A. G. H.).

ULLER (K.). Die Entdeckung des Wellen-Begriffes. Würzburg, Triltsch, 1937. 7+116 pp.

VER EECKE (P.). Euclide. L'optique et la catoptrique. Paris and Bruges, Descleé de Brouwer, 1938. 47+126 pp.

WATKEYS (C. W.), Edited by. An orientation in science. New York, McGraw-Hill, 1938. 575 pp.

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## ENDOWMENT FUND

In 1923 an Endowment Fund was collected for the support of the ever increasing number of important mathematical memoirs. Of this fund, which now amounts to some $70,000, a considerable proportion was contributed by members of the Society.

## PRIZE FUNDS

*The Bôcher Memorial Prize.*

This prize was founded in memory of Professor Maxime Bôcher. It is awarded every five years for a notable research memoir in analysis which has appeared during the preceding five years in a recognized journal published in the United States or Canada; the recipient must be a member of the Society, and not more than fifty years old at the time of publication of his memoir.

First (Preliminary) Award, 1923: To G. D. Birkhoff, for his memoir *Dynamical systems with two degrees of freedom.*

Second Award, 1924: To E. T. Bell, for his memoir *Arithmetical paraphrases,* and to Solomon Lefschetz, for his memoir *On certain numerical invariants with applications to abelian varieties.*

Third Award, 1928: To J. W. Alexander, for his memoir *Combinatorial analysis situs.*

Fourth Award, 1933: To Marston Morse, for his memoir *The foundations of a theory of the calculus of variations in the large in m-space,* and to Norbert Wiener, for his memoir *Tauberian theorems.*

*The Frank Nelson Cole Prize in Algebra.*
*The Frank Nelson Cole Prize in the Theory of Numbers.*

These prizes were founded in honor of Professor Frank Nelson Cole, on the occasion of his retirement as Secretary of the American Mathematical Society and editor of the Bulletin, after twenty-five years of service; the fund was later doubled by his son, Charles A. Cole. They are to be awarded at five-year intervals for contributions to algebra and the theory of numbers, respectively, under restrictions similar to those for the Bôcher prize.

First Award, 1928: To L. E. Dickson, for his book *Algebren und ihre Zahlentheorie,* Zurich, 1927.

Second Award, 1931: To H. S. Vandiver, for his several papers on Fermat's last theorem published in the Transactions of the American Mathematical Society and the Annals of Mathematics during the last five years, with special reference to a paper entitled *On Fermat's last theorem,* which appeared in volume 31 of the Transactions.

*The Eliakim Hastings Moore Fund.*

This fund was founded in 1922 in honor of Professor Eliakim Hastings Moore, on the occasion of the twenty-fifth anniversary meeting of the Chicago Section of the American Mathematical Society. The interest on the fund is to be

used at the discretion of the Council of the Society, for the publication of important mathematical books or memoirs or the award of prizes.

*The Marion Reilly Fund.*

Dean Marion Reilly willed to the American Mathematical Society a portion of her estate to be used for the advancement of research in pure mathematics. Thus far the Society has received approximately $14,000. The estate is not entirely settled, and the Society will receive additional funds within the next few years.

## SELECTIONS FROM THE TABLE OF LIFE MEMBERSHIP FEES

(Rates for other years may be obtained from the Treasurer.)

| Age | Fee | Age | Fee |
|---|---|---|---|
| 25 | $143.37 | 55 | $94.36 |
| 30 | 137.93 | 60 | 82.74 |
| 35 | 131.48 | 65 | 70.71 |
| 40 | 123.88 | 70 | 58.81 |
| 45 | 115.13 | 75 | 47.56 |
| 50 | 105.24 | 80 | 37.44 |

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## ILLINOIS

**Bloomington**
M. Hunt
**Carbondale**
Mayor
**Carlinville**
G. R. Carter
**Chicago**
E. R. Carter
Haberzetle
Hornberger
Korzybski
H. C. Levinson
F. H. Murray
I. K. Murray
A. R. Schweitzer
B. Smith
*Armour Institute of Technology*
Bibb
D. F. Campbell
W. M. Davis
L. R. Ford
Fulton
Giddings
Krathwohl
Mansfield
Oldenburger
Perlin
*Central Y.M.C.A. College*
J. E. Davis
Gore
*DePaul University*
Corliss
*Loyola University*
Gerst
Moran

O'Mara
Tordella
*North Park College*
C. G. Erickson
*St. Francis Xavier College*
E. C. Pixley
*University of Chicago*
Alaoglu
A. A. Albert
Barnard
Bartky
Besancon
Bliss
Dickson
Dribin
H. S. Everett
Garbe
Goldstine
L. M. Graves
Hartung
M. R. Hestenes
E. P. Lane
Logsdon
Lunn
MacMillan
Niven
Perlis
Reid
Sanger
Schultz
Senior
Tornheim
Umberger
Y. K. Wong
J. W. A. Young
*Woodrow Wilson Junior College*
Kinney
**DeKalb**
Hellmich
**Elsah**
Hooper
**Eureka**
Newson
**Evanston**
Peck
*Northwestern University*
D. R. Curtiss
H. T. Davis
H. L. Garabedian
Griffiths
H. K. Hilton
Holgate
E. J. Moulton
Simmons
Wall
Wescott
H. E. Wilson
F. E. Wood
**Galesburg**
R. C. Stephens
**Joliet**
F. C. Smith
**Kenilworth**
W. W. Hart
**Lake Forest**
Curtis
**Lisle**
Shonka
**Monmouth**
Beveridge
**Naperville**
I. F. Keeler
**Northbrook**
E. O. Schweitzer
**Oak Park**
Escott
**Peoria**
Comstock
**Rockford**
M. P. McGavock
**Rock Island**
Cederberg
**Springfield**
N. W. Wells
**Urbana**
Halmos
G. S. Ketchum
*University of Illinois*
Ambrose
B. M. Armstrong
Baer
H. W. Bailey
Bartlett
Beaumont
Bourgin
O. K. Bower
Brahana
Bristow
J. D. Campbell
Carmichael
Cassity
Chanler
Coble
Crathorne
Dennis
Doob
Eachus
Emch
Hansman
Hartley
Hazlett
Hoersch
Kent
P. W. Ketchum
Kibbey
Leibler
H. Levy
Lindstrum
Maker
C. E. Marshall
R. G. Mason
Mendel
H. J. Miles
G. A. Miller
R. A. Miller
E. D. Pepper
J. W. Peters
Starr
H. P. Terry
Townsend
Trjitzinsky
Turpin
Vaughan
Welker
F. J. Weyl
W. Wilson
**Yates City**
Norval

## INDIANA

**Angola**
V. R. Jones
**Bloomington**
Edmondson
L. Green
Hennel
M. G. Moore
K. P. Williams
H. E. Wolfe
**Collegeville**
Schon
**Greencastle**
Edington
**Hanover**
Meyer
**Indianapolis**
L. C. Cox
Gingery
*Butler University*
J. L. Beal
Getchell
**Lafayette**
E. S. Akeley
Duffin
Hodge
Jonah
Lanczos
W. Marshall
T. E. Mason
Schaeffer
Shreve
A. H. Smith
R. B. Stone
Webster
Westlund
**Muncie**
Whitcraft
**Notre Dame**
Gassensmith
Kenna
Menger
Milgram
P. M. Pepper
**Paoli**
Bentley
**Richmond**
H. D. Owens
**Terre Haute**
Palmer

## IOWA

**Ames**
E. S. Allen
Atanasoff
Gouwens
Gross
Herr
Higdon
Hinrichsen
Holl
J. V. McKelvey
M. M. McKelvey
P. G. Robinson
E. R. Smith
H. F. Smith
J. S. Turner
**Cedar Falls**
Kearney
Van Engen
**Cedar Rapids**
Coffin
**Decorah**
Legvold
Norlie
**Des Moines**
Hunter
P. C. Irwin
McCankie
MacKinnon
Nollen
**Dubuque**
M. R. Metzler
Theobald
**Grinnell**
McClenon
Rusk
**Iowa City**
Huntoon
*University of Iowa*
Chittenden
Conkwright
A. T. Craig
Gutzman
R. O. Lane
Oberg
H. V. Price
Reilly
H. L. Rietz

Rigby
Sealander
L. E. Ward
R. Woods
**Mt. Vernon**
Moots
**Oskaloosa**
Rothe
**Sioux City**
Graber
Gwinn

## KANSAS

**Atchison**
Pretz
H. Sullivan
**Bethel College**
Richert
**Emporia**
O. J. Peterson
C. B. Tucker
**Hays**
Warnock
**Lawrence**
W. Babcock
P. O. Bell
F. L. Black
H. E. Jordan
U. G. Mitchell
G. B. Price
G. W. Smith
Stouffer
J. J. Wheeler
**Linsborg**
Marm
**Manhattan**
R. W. Babcock
Daugherty
Hyde
Mossman
Munro
Rawhouser
Remick
Sigley
Stratton
**Pittsburg**
Shirk
R. G. Smith
**Salina**
Arnoldy
Jensen
**Topeka**
Eberhart
W. A. Harshbarger
Householder
**Wichita**
Longenecker

## KENTUCKY

**Berea**
Hutcherson
**Bowling Green**
Strayhorn
Yarbrough
**Burlington**
W. A. Barnett
**Covington**
Thuener
**Lexington**
P. P. Boyd
L. W. Cohen
H. H. Downing
F. John
Latimer
LeStourgeon
Pence
**Louisville**
Bullitt
Fowler
*University of Louisville*
W. L. Moore
Stevenson
**Murray**
Carman
**Richmond**
Jenkins
R. S. Park
**Winchester**
Allison

## LOUISIANA

**Baton Rouge**
Aucoin
Parker
Rutt
Sanders
H. L. Smith
**New Orleans**
Derby
Rayl
Riess
*Loyola University*
Fleddermann
*Newcomb College*
N. L. Anderson
M. G. Humphreys
Many
M. C. Spencer
Weiss
*Tulane University*
H. E. Buchanan
Cronvich
Duren
C. Hopkins
**Ruston**
Gentry

## MAINE

**Brunswick**
Hammond
Holmes
Korgen
W. A. Moody
**Orono**
Bryan
S. H. Kimball
**Waterville**
Schoenberg

## MARYLAND

**Aberdeen**
Dederick
**Annapolis**
*St. John's College*
S. Buchanan
Comenetz
*U. S. Naval Academy*
H. C. Ayres
N. H. Ball
Bramble
Capron
R. Church
Clements
A. E. Currier
Echols
Hawkins
Kells
Littauer
T. W. Moore
Rawlins
Root
J. O. Scarborough
L. T. Wilson
**Baltimore**
Dawkins
Parke
L. B. Robinson
F. D. Sutton
*Goucher College*
C. L. Bacon
Garland
F. P. Lewis
Torrey
*Johns Hopkins University*
A. Cohen
I. S. Cohen
van Kampen
Morrill
Muhly
Murnaghan
Netzorg
Popow
L. J. Reed
Schilling
J. Williamson
Wintner
Zariski
**Cheltenham**
Hartwell
**Chestertown**
W. J. Robinson
**College Park**
Hirshfeld
*University of Maryland*
Dantzig
Lancaster
M. H. Martin
Sagen
Titt
**Westminster**
Spicer

## MASSACHUSETTS

**Amherst**
B. L. Brown
Esty
Sprague
**Belmont**
C. W. Franklin
R. R. Struik
**Boston**
Cleary
Dysart
A. B. Gould
L. A. McCoy
Plass
Rines
*Boston University*
Bruce
Mode
*Graduate School of Business Administration, Harvard University*
T. H. Brown
*School of Public Health, Harvard University*
E. B. Wilson
*John Hancock Mutual Life Insurance Company*
Abbott
H. A. Garabedian
Grout
Howe
Vatter
*Northeastern University*
E. E. Haskins
Spear
**Brookline**
A. L. Miller
**Cambridge**
E. W. Wilson
*Harvard University*
Andrews
Beatley

G. Birkhoff
G. D. Birkhoff
H. E. Clifford
Coolidge
W. C. Graustein
J. W. Green
Halperin
A. D. Hestenes
Huntington
R. F. Jackson
W. T. Lewis
Lyman
MacLane
Osgood
Oxtoby
D. T. Perkins
Pipes
Rabinow
Rulon
Shapley
H. M. Sheffer
M. H. Stone
Ulam
J. H. Van Vleck
Walsh
Westergaard
H. Whitney
Widder

*Massachusetts Institute of Technology*
V. Bush
R. H. Cameron
A. H. Clifford
Crout
Douglass
P. Franklin
C. E. Fuller
Gere
Harvey
Keyes
Lamoreau
N. Levinson
B. McMillin
W. T. Martin
Moon
H. B. Phillips
Rule
Rutledge
D. J. Struik
Vallarta
Wiener
F. S. Woods
Zeldin

*Radcliffe College*
R. B. Adams
M. C. Graustein

**Charlestown**
Haight

**Chestnut Hill**
Marcou
O'Donnell

**Indian Orchard**
Lanckton

**Ipswich**
Kinsman

**Jamaica Plain**
Kaplan

**Lynn**
Bauer
Chako

**Medford**
J. L. Barnes
M. S. Barnes
Ransom
F. G. Wren

**Milton**
H. H. Welch

**Natick**
R. Willis

**Newton Highlands**
Holley

**Northhampton**
Munroe

*Smith College*
Benedict
N. H. McCoy
D. Montgomery
Rambo
R. G. Wood

**Norton**
C. A. Garabedian

**Pittsfield**
Washburne

**Southbridge**
Boeder

**South Hadley**
F. E. Baker
D. L. Bernstein
Litzinger

**Springfield**
A. V. Newton
W. B. Robinson

**Swampscott**
G. W. Evans

**Wellesley**
Comegys
L. P. Copeland
Holly
H. A. Merrill
Russell
Clara E. Smith
Stark
M. M. Young

**Weston**

*Regis College*
Burke

*Weston College*
McCormick
O'Connor

**Williamstown**
Agard
J. G. Hardy
D. E. Richmond
Shepard
V. H. Wells

**Worcester**
Lengyel
A. H. Wheeler

*Worcester Polytechnic Institute*
Gay
Morley
H. Rice

## MICHIGAN

**Albion**
Sleight

**Ann Arbor**
Herman E. Arnold
Grennan

*University of Michigan*
W. L. Ayres
Bartels
Bradshaw
C. O. Carey
Churchill
Claytor
A. H. Copeland
C. C. Craig
Dushnik
Dwyer
Field
W. B. Ford
Gaskell
J. W. Glover
Greville
T. H. Hildebrandt
L. A. Hopkins
Kales
Karpinski
Kazarinoff
Kossack
Laporte
C. E. Love
E. W. Miller
S. B. Myers
Nesbitt
Nyswander
Ollmann
R. S. Phillips
V. C. Poor
Rainich
Rainville
Running
Shanks
Thrall
Vance
R. L. Wilder

**Detroit**
Denton
Fisk
Fleiger
M. Friedman
C. D. Jones
Weinberg

*University of Detroit*
Hausmann
McCarthy
Muehlmann

*Wayne University*
Borgman
Coral
Fischer
Folley
Morrow
A. L. Nelson
Paxson
H. H. Pixley
M. C. Wolf

**East Lansing**
Baten
Dresher
P. L. Dressel
V. G. Grove
J. D. Hill
Hurd
W. S. Kimball
H. L. Olson
Plant
Speeker
VanSchaack
Welmers

**Highland Park**
Tolonen

**Hillsdale**
Beeler

**Kalamazoo**
Schneider
T. O. Walton

**Marquette**
Spooner

**Nazareth**
Fites

**Royal Oak**
P. Ladue

## MINNESOTA

**Coleraine**
Fattu

**Duluth**
Cothran

**Ely**
P. Cramer

**Minneapolis**
M. J. Norris
M. A. Wilder

*University of Minnesota*
Brenner

Brink
Brooke
Bussey
S. E. Carlson
Campaigne
Dalaker
Elveback
Gibbens
Gunstad
W. L. Hart
E. L. Hill
D. Jackson
Ness
Scammon
Scherberg
Shumway
Underhill
Wegner

**Moorhead**
M. R. Anderson
Rasmusen

**Northfield**
Shover

**St. Paul**
*College of St. Thomas*
L. E. Bush
Nosker
Thielman
*Macalester College*
E. J. Camp

**Winona**
L. J. Dodd
Seiler

## MISSISSIPPI

**Agricultural College**
C. D. Smith

**Alcorn**
W. B. Nelson

**Blue Mountain**
Trott

**Cleveland**
Hickey

**Hattiesburg**
W. B. Brown

**Holly Springs**
Maclin

**Jackson**
D. McCoy
Sampson

**Mathiston**
Compton

**Starkville**
B. M. Walker

**State College**
Ollivier
F. P. Welch

**University**
Hume

## MISSOURI

**Clayton**
Rosskopf

**Columbia**
*Christian College*
Spalding
*University of Missouri*
H. Betz
Blumenthal
Ewing
Hedberg
Michel
Wahlin
Westfall

**Jefferson City**
Talbot

**Kansas City**
Basye
Benscoter
Melcher
*University of Kansas City*
Luby
*St. Teresa's College*
Creane

**Parkville**
Crull

**St. Louis**
E. L. Harris
E. W. King
Nagle
Rafferty
Short
*Harris Teachers College*
Osborn
*Maryville College*
Kernaghan
*St. Louis College of Pharmacy*
DeFoe
*St. Louis University*
Case
Regan
A. E. Ross
*Washington University*
Dunkel
Rider
Roever
J. Y. Stephens

**Springfield**
H'Doubler
*Drury College*
Finkel
W. L. Graves

**Warrensburg**
DeVore
J. H. Scarborough
Urban

## MONTANA

**Bozeman**
Hurst
Schwid

**Helena**
Canning
Topel

**Missoula**
E. F. A. Carey
Chatland
Lennes
A. S. Merrill

## NEBRASKA

**Lincoln**
*Union College*
Specht
*University of Nebraska*
Basoco
Brenke
C. C. Camp
Candy
Collins
Doole
Gaba
Pierce
Runge

**Omaha**
Earl
Fitzpatrick

**Wayne**
J. W. Boyce
Hove

## NEVADA

**Reno**
Maddaus
E. L. Ross
F. Wood

## NEW HAMPSHIRE

**Concord**
G. M. Conwell
Frank

**Durham**
Slobin
Solt

**Exeter**
Pieters

**Hanover**
E. P. Brown
F. M. Morgan
*Dartmouth College*
B. H. Brown
Forsyth
C. N. Haskins
Mathewson
F. W. Perkins
R. Robinson
Silverman
C. E. Wilder

## NEW JERSEY

**Belleplain**
Durell

**East Orange**
E. M. Torrance

**Hackettstown**
LaMotte

**Hightstown**
Harrison
Huntley
Litterick

**Hoboken**
L. E. Armstrong
H. N. Davis
Deimel
Hazeltine

**Keyport**
Fullerton

**Leonia**
Karapetoff

**Mountain Lakes**
S. E. Hotelling

**Newark**
Charton
Conkling
E. E. Rhodes
J. S. Thompson
Widmark
*Essex County Junior College*
Bull
*Newark College of Engineering*
Fithian
*Prudential Insurance Company*
Bartleson
Mosesson
Sosnow

**New Brunswick**
*New Jersey College for Women*
Meder
C. A. Nelson
Walter
*Rutgers University*
Brasefield
Bunyan
H. S. Grant
R. Morris
M. S. Robertson
Starke
Traber

**Plainfield**
Barlow

**Princeton**
F. W. Burton

*Institute for Advanced Study*
J. W. Alexander
Becker
Bergmann
Busemann
Calkin
Hurewicz
D. Manning
Mayer
A. P. Morse
M. Morse
**von Neumann**
Serbin
C. C. Torrance
Veblen
H. Weyl
*Princeton University*
E. P. Adams
Bochner
Bohnenblust
A. A. F. Brown
A. Church
DiSalvatore
Duthie
L. P. Eisenhart
Flood
R. H. Fox
Gillespie
Lefschetz
J. M. H. Olmstead
H. P. Robertson
Steenrod
Strodt
Tompkins
A. W. Tucker
Tukey
Wallman
Wedderburn
Wigner
Wilks
**South Orange**
Rauch
Stanwick
**Trenton**
Shuster
**Upper Montclair**
G. A. Campbell
*New Jersey State Teachers College*
D. R. Davis
Fehr
E. H. C. Hildebrandt
Mallory
**West Orange**
Edison

## NEW MEXICO

**Albuquerque**
Barnhart
Derry
Newsom
**Las Vegas**
Rodgers
**Portales**
MacKay
**Roswell**
Alden
**State College**
P. K. Rees

## NEW YORK

**Albany**
Frankel
W. R. Thompson
*New York State College for Teachers*
Beaver
Birchenough
DoBell
Lester
E. C. Stokes
**Alfred**
Lowenstein
**Aurora**
Carroll-Rusk
M. P. Hollcroft
T. R. Hollcroft
**Brooklyn**
E. M. Blake
Blanch
Deutsch
Douglas
Lassar
L. L. Locke
Schuyler
Wolfowitz
Wynne
*Brooklyn College*
Borofsky
Boyer
DeCicco
Dillon
Feld
Fialkow
Fleisher
H. M. Griffin
R. A. Johnson
Kennison
J. P. Kormes
A. W. Landers
Lowan
MacNeish
L. T. Moore
Prenowitz
M. Richardson
Rosenthal
J. Singer
J. Wolfe
Woodbridge
*Long Island University*
H. G. Lieber
L. R. Lieber
*Polytechnic Institute of Brooklyn*
William Johnston Berry
Fenn
Greeley
Whitford
*Pratt Institute*
Cowles
J. E. Thompson
*St. Joseph's College for Women*
Larkin
**Buffalo**
Coombs
Podmele
*D'Youville College*
M. Q. Brown
*University of Buffalo*
Gehman
Montague
E. R. Ott
Pound
**Canton**
Bates
**Clinton**
H. S. Brown
Carruth
Ferry
**Crown Point**
Henderson
**Elmira**
Suffa
**Far Rockaway**
L. Moore
**Flushing**
R. G. Archibald
A. B. Brown
S. S. Cairns
Cope
N. A. Hall
Hartman
Hoffman
Hofmann
Raudenbush
Sard
M. M. Sullivan
Zippin
**Garden City**
J. Bowden
**Geneva**
Durfee
Hubbs
**Hamilton**
Aude
Munshower
A. W. Smith
Wardwell
**Hempstead**
Stevens
**Ithaca**
E. A. Miller
Wray
*Cornell University*
Agnew
Carver
J. H. Curtiss
Flexner
E. A. S. Galbraith
Givens
W. J. Harrington
Herzog
Hurwitz
Johannes
B. W. Jones
Lawrence
D. C. Lewis
Malti
D. S. Miller
Randolph
J. B. Rosser
Sharpe
S. Sherman
V. Snyder
Tanner
M. E. Terry
G. B. Thomas
Trevor
R. J. Walker
**Long Island City**
Killian
**Mt. St. Vincent-on-Hudson**
C. M. O'Brien
Sheridan
**New York**
J. Alsberg
J. W. Arnold
Berkeley
Berman
Boehm
M. A. Bowden
L. Burgess
R. W. Burgess
Cosby
Downey
G. A. Ellis
Frey
Gallatin
Gibbs
R. L. Gilman
W. J. Graham

Greitzer
Ingram
Jablonower
Jacobus
Joffe
Kagno
B. C. Keeler
S. Y. Keyser
B. F. Kimball
F. G. King
Kircher
Kolchin
M. Kormes
Laderman
L. A. Lorch
Madow
Mirick
Murphy
Neuman
Otten
Parsons
Polachek
E. A. Porter
Preston
C. A. Richmond
Robbins
Roos
Roosevelt
R. C. Shook
L. G. Simon
E. D. Smith
Steinman
Tanzola
Vitale
W. Weaver
A. W. Whitney
E. C. Williams

*American Mathematical Society*
E. M. Hull
O. L. Wheeler

*American Telephone and Telegraph Company*
Belcher
Carson
Halbert

*Bell Telephone Laboratories*
Bode
E. T. Burton
Dietzold
R. M. Foster
Fry
Gray
Hebbert
Hoyt
P. C. Jones
Kammerer
MacColl
Mead
Molina
P. S. Olmstead
Riordan
Sandalls
Schelkunoff
Shewhart
Stibitz
Sunde
Vaage
Wise
Zobel

*College of the City of New York*
Barber
Boeker
Davidowitz
Garrison
Gill
C. C. Grove
Hubert
Linehan
Nathan
P. Newman
Philip
Post
F. G. Reynolds
S. L. Robinson
Shiffman
Wetzel
Wirth
Wright

*Columbia University*
A. C. Berry
Clingan
W. B. Coleman
M. A. Durand
Fiske
Fite
Gorn
Gourin
Hawkes
H. Hotelling
A. W. Jones
Kasner
C. J. Keyser
Koopman
M. E. Ladue
Levi
E. R. Lorch
Mullins
F. J. Murray
Northcott
Pfeiffer
C. L. Poor
Ramsey
Reeve
Rehberg
Ritt
Rubin
Ruger
Schatten
Serghiesco
Siceloff
D. E. Smith
P. A. Smith
Sole
Thorndike
Upton
Wehausen
H. B. Williams

*Cooper Union*
Lehmann
MacDonald
F. H. Miller
Reddick

*Fordham University*
Kubis

*Hunter College*
H. S. Adams
R. L. Anderson
Bradley
Jewell H. Bushey
J. H. Bushey
Cooper
Darkow
Eisele
Guggenbühl
L. S. Hill
Knowler
M. K. Landers
Levin
McLaughlin
M. S. Rees
Simons
Tuller
Weisner

*Manhattanville College of the Sacred Heart*
Mira

*Metropolitan Life Insurance Company*
Alfieri
Bassford
William James Berry
R. V. Carpenter
J. D. Craig
Fisanick
J. A. Hamilton
Hohaus
Lotka
Penney
H. Rosser

*Mutual Life Insurance Company*
Monsky
Strong

*New York University*
Adler
Baron
F. Bernstein
Birnbaum
Blau
Cooley
Courant
Farnum
Flanders
Friedrichs
P. H. Graham
F. C. Hall
Helliwell
F. W. John
M. Kline
McKinsey
Payne
A. S. Peters
R. G. Putnam
S. G. Roth
Schlauch
Siller
Stoker
Tilley
Wahlert
Yanosik

*Yeshiva College*
Ginsburg

**Niagara University**
Banks

**Oneonta**
Schoonmaker

**Perry**
G. W. Walker

**Poughkeepsie**
Cowley
L. D. Cummings
Hopper
G. Smith
M. E. Wells
H. S. White
Wishard

**Riverdale-on-Hudson**
H. B. Mitchell

**Rochester**
W. Betz
Herzberger

*University of Rochester*
Clark
A. S. Galbraith
Gale
Long
Seidel
Watkeys

**Rockville Centre**
A. M. C. Grant
Groat

**St. Bonaventure**
A. O'Brien

**Saratoga Springs**
E. N. Akeley
**Schenectady**
*General Electric Company*
Alger
Poritsky
Ruiz
*Union College*
Burkett
Farrell
A. H. Fox
Garis
D. S. Morse
A. D. Snyder
Ulrich
**Scotia**
Leibing
**Syracuse**
W. H. Metzler
Roe
*Syracuse University*
A. D. Campbell
I. S. Carroll
Cowgill
Decker
Harwood
**Troy**
E. B. Allen
D. B. Ames
Huston
Rempfer
Street
**Warsaw**
Schneckenburger
**West Point**
H. Jones
**Willseyville**
Seely

## NORTH CAROLINA

**Buie's Creek**
R. E. Smith
**Chapel Hill**
Browne
E. A. Cameron
C. L. Carroll
Garner
Hobbs
Hoyle
Jacobson
Lasley
Linker
Mackie
Winsor
**Clinton**
Culbreth
**Concord**
Boulware
**Davidson**
W. G. McGavock
**Durham**
Carlitz
F. G. Dressel
W. W. Elliott
George
Gergen
Greenwood
Hickson
Maria
E. R. C. Miles
W. L. Morris
Odoms
Roberts
J. M. Thomas
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Daniels
Pegram
**Greenville**
ReBarker
**Jacksonville**
Key
**Raleigh**
Bullock
Cell
J. M. Clarkson
Fisher
Levine
Mumford
Nahikian
H. V. Park
Winton
**Salisbury**
Dearborn

## NORTH DAKOTA

**Fargo**
I. W. Smith

## OHIO

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Hildner
**Ashland**
Stopher
**Athens**
Denbow
Marquis
F. W. Reed
Starcher
**Bluffton**
Hirschler
**Bowling Green**
Ogg
Overman
**Cincinnati**
Reingold
*University of Cincinnati*
I. A. Barnett
L. Brand
Farnau
Hancock
Justice
Kersten
Lubin
Merriman
H. L. Miller
C. N. Moore
E. S. Smith
Szász
W. C. Taylor
Yowell
*Western and Southern Life Insurance Company*
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Learson
Ryan
C. M. Williams
William J. Williams
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O. E. Brown
Burington
Dobbie
Focke
McCuskey
M. Morris
Nassau
Rinehart
C. F. Thomas
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Tolar
*Western Reserve University*
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Musselman
Sauté
W. G. Simon
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Jennings
J. C. Rietz
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Bamforth
Bareis
Blumberg
Kuhn
LaPaz
Manson
Radó
Rasor
C. E. Rhodes
Toops
J. H. Weaver
Wylie
**Dayton**
Midgley
**Delaware**
Rowland
**Gambier**
Bumer
MacNeille
**Granville**
Kato
Ladner
Wiley
**Green Camp**
Leach
**Hiram**
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**Kent**
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F. Harshbarger
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Stelson
**Marietta**
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Sandt
**Mt. St. Joseph**
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**Oberlin**
W. D. Cairns
M. M. Johnson
Sinclair
Yeaton
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Pollard
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Tappan
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**South Euclid**
Garvin
**Toledo**
Brandeberry
**Wilberforce**
Davidson
**Wilmington**
Spinks
**Wooster**
C. O. Williamson
Yanney
**Yellow Springs**
Astrachan

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**Holdenville**
Wedel

**Norman**
La Fon
*University of Oklahoma*
Brixey
Court
Hassler
McFarland
Meacham
Randels
Reaves
**Stillwater**
J. Barnett
Diamond
O. H. Hamilton
**Tu'sa**
Hodell

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Harrold
Hoel
W. E. Milne
Scheffé
**Grant's Pass**
Feinler
**Eugene**
DeCou
Ghent
Moursund
**Portland**
F. L. Griffin
Vassallo
**Salem**
C. F. Luther
Olshen

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Koehler
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P. S. Wagner
**Bethlehem**
H W. Alexander
Beale
Cobb
Cutler
Fort
E. S. Kennedy
Lamson
Langhaar
Latshaw
D. H. Lehmer
Pitcher
Raynor
C. A. Shook
Smail
M. F. Smiley
Vanderslice
Waidelich
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Fobes
Greenebaum
Hedlund
Lehr
A. P. Wheeler
*Shipley School*
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Steinmetz
**California**
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**Chambersburg**
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R. F. Johnson
Weeks
**Clarion**
C. E. Carey
**Collegeville**
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Ficken
W. M. Smith
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Slepian
**Gettysburg**
Arms
Reen
**Greensburg**
McNeil
**Harrisburg**
McKee
Whited
**Haverford**
Allendoerfer
Gummere
Oakley
A. H. Wilson
**Hazleton**
Herpel
**Immaculata**
McGuckin
Mary Columba
**Jenkintown**
J. C. Durand
**Kutztown**
Knedler
**Latrobe**
Yahner
**Lewisburg**
Drum
**Lincoln University**
Haviland
**Loretto**
Sugar
**New Wilmington**
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Beamish
Biser
R. D. Brown
Fudge
McDonough
Patterson
Pratt
J. Sherman
V. E. Spencer
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Tartler
*St. Joseph's College*
Vezeau
*Temple University*
Gleason
Lawton
C. N. Stokes
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E. E. Betz
Caris
J. A. Clarkson
H. B. Evans
D. W. Hall
Huff
J. R. Kline
Knobelauch
Lufkin
H. H. Mitchell
W. B. Morgan
Nicholson
Rademacher
Safford
Shohat
Shugert
Whiteman
Witmer
Zuckerman
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Burns
*Carnegie Institute of Technology*
Dines
Hicks
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Landau
Morehead
Moskovitz
Neelley
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Riggs
Rosenbach
Saibel
T. L. Smith
Whitman
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Briant
*Pennsylvania College for Women*
Calkins
*University of Pittsburgh*
Culver
Foraker
Knipp
Speer
J. S. Taylor
**Scranton**
M. B. Walton
**Selinsgrove**
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**State College**
H. B. Owens
*Pennsylvania State College*
T. Cohen
Curry
A. H. Frink
O. Frink
Gordon
Gravatt
C. H. Graves
Hagen
Krall
E. I. Moody
F. W. Owens
I. M. Sheffer
Stecker
C. C. Wagner
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Swann
*Swarthmore College*
Brinkmann
Dresden
Marriott
**Uniontown**
E. Johnson
**Wallingford**
J. A. Miller
**Washington**
Caton
*Washington and Jefferson College*
Atchison
Dorwart
Shaub
**Wilkes-Barre**
W. I. Miller

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Jaramillo
*University of the Philippines*
Gokhale
**Baguio**
Melchor

**PORTO RICO**

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Morales
Sánchez-Díaz
**Rio Piedras**
Horne
Kuschke

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R. C. Archibald
Beesley
A. A. Bennett
Carlen
Coon
C. H. Currier
Day
Demers
Frame
R. E. Gilman
R. E. Johnson
Lindsay
H. P. Manning
R. G. D. Richardson
C. H. Smiley
C. S. Sutton
Tamarkin
Warschawski
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McKenney
Précourt
**West Warwick**
Brant

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Royall
**Columbia**
*Allen University*
Peguese
*University of South Carolina*
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J. B. Jackson
**Orangeburg**
Jewell
**Rock Hill**
R. W. Stokes
**Spartanburg**
C. S. Pettis

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Walder
Wente
**Rapid City**
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**Vermillion**
Beaty

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Farnsworth
**Knoxville**
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MacQueen
**Nashville**
Clement
J. K. Peterson
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Van Horn
*George Peabody College for Teachers*
F. L. Wren
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Miser
Sarratt
**Sewanee**
Bruton

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Mullings
**Austin**
Vickery
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Batchelder
H. V. Craig
Decherd
E. L. Dodd
Ettlinger
F. B. Jones
Kaltenborn
Lubben
R. L. Moore
G. H. Porter
M. B. Porter
Sorgenfrey
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R. H. Cramer
**Beaumont**
M. A. Campbell
**College Station**
Chaney
Hurt
Klipple
H. A. Luther
Lyle
**Corpus Christi**
Seale
**Dallas**
P. V. Montgomery
Palmquist
**Denton**
Hanson
**El Paso**
Turrittin
**Fort Worth**
Sherer
**Galveston**
Hahn
**Houston**
Ricker
Rust
Slotnick
*Rice Institute*
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Bray
A. C. Dean
Leighton
Lovett
Nash
H. A. Wilson
*University of Houston*
J. D. Hutchinson
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Querry
**Jacksonville**
H. E. Clarkson
**Kingsville**
E. C. Kennedy
**Lubbock**
C. P. Brady
Michie
E. L. Thompson
**Marlin**
Falconer
**Mercedes**
W. F. Shaw
**San Antonio**
Scott
*Incarnate Word College*
Gough
*Our Lady of the Lake College*
M. L. Hill
*St. Mary's University of San Antonio*
Schnepp
*San Antonio Junior College*
Hurry
Tulloch
**Waco**
Walter J. Williams
**Waxahachie**
G. A. Newton

**UTAH**

**Logan**
Bird
Tingey
**Salt Lake City**
Gibson
Hayes
Horsfall
Pehrson
H. Rees
S. S. Smith
Stafford

**VERMONT**

**Burlington**
Bullard
Fraleigh
Swift
**Middlebury**
Hedge
**Northfield**
L. E. Dix

**VIRGINIA**

**Blacksburg**
Hatcher
J. E. Williams
**Charlottesville**
Kelley
Linfield
Luck
McShane
Oglesby
Puckett
Schweigert
Sparrow
Wallace
G. T. Whyburn
**Dahlgren**
Barker
L. T. E. Thompson
**Ettrick**
R. R. McDaniel
**Fredericksburg**
H. C. Carter
**Hampden-Sidney**
E. R. Elliott

**Hampton**
H. A. Perkins
Simond
**Hollins**
M. J. Cox
**Hopewell**
Fazel
**Lexington**
*Virginia Military Institute*
Byrne
I. G. Foster
Knox
Purdie
*Washington and Lee University*
Paxton
C. W. Williams
**Lynchburg**
Larew
Modesitt
Wiggin
**Richmond**
E. J. Willis
*University of Richmond*
Gaines
Ritter
C. H. Wheeler
**South Boston**
Patten
**Staunton**
M. E. Taylor
**Williamsburg**
Stetson
**Sweet Briar**
N. Cole
Morenus

## WASHINGTON

**College Place**
Godfrey
**Pullman**
Biggerstaff
L. G. Butler
Colpitts
Hacker
Huebelman
**Seattle**
*Seattle Pacific College*
Beegle
*University of Washington*
C. R. Ballantine
J. P. Ballantine
A. F. Carpenter
Copenhagen
Cramlet
J. P. Dean
Jerbert
McFarlan
Magnusson
Moritz
Mullemeister
Neikirk
Taub
Winger
**Spokane**
J. A. Carlson
**Walla Walla**
Bratton
Highberg

## WEST VIRGINIA

**Bethany**
Cramblet
Erskine
**Harpers Ferry**
Meighan
**Huntington**
Hackney
**Montgomery**
W. F. Smith
**Morgantown**
Colwell
H. A. Davis
R. H. Downing
Eiesland
C. N. Reynolds
B. M. Turner
**Parkersburg**
Middleswart
**Philippi**
B. D. Grant
**Wheeling**
Bagby

## WISCONSIN

**Beloit**
Bisshopp
H. H. Conwell
**Kenosha**
A. E. May
**Madison**
Hayden
*University of Wisconsin*
G. E. Albert
F. E. Allen
Breit
R. H. Cole
C. Eisenhart
R. Erickson
H. P. Evans
C. J. Everett
B. Friedman
Gatewood
V. C. Harris
Hyers
Ingraham
S. B. Jackson
Kershner
Kiokemeister
Kleene
Langer
Lee
W. C. McDaniel
MacDuffee
March
W. L. G. Mitchell
Pell
Slichter
C. B. Smith
W. N. Smith
E. S. Sokolnikoff
I. S. Sokolnikoff
Trimble
Trump
E. B. Van Vleck
Varino
R. W. Wagner
Whaples
Wilcox
Zilmer
**Milwaukee**
P. H. Evans
*Marquette University*
Pettit
Wilczewski
*Milwaukee-Downer College*
Beckwith
*State Teachers College*
Knight
R. E. Norris
*University of Wisconsin*
Bardell
Battig
Marden
Nordhaus
Parkinson
W. E. Roth
Vass
L. A. Wolf
**Oshkosh**
Beenken
I. Price
**River Falls**
Eide
**Superior**
C. W. Smith
**West De Pere**
DeCleene
Sromovsky
**Wisconsin Rapids**
M. B. McMillan

## WYOMING

**Cody**
Bellamy
**Laramie**
Rechard

## CANADA

### Alberta

**Edmonton**
J. W. Campbell
A. J. Cook
Sheldon

### British Columbia

**Vancouver**
F. J. Brand
D. Buchanan
Gage
R. Hull
Nowlan

### Manitoba

**Winnipeg**
N. R. Wilson

### New Brunswick

**Sackville**
W. H. McEwen
Nickerson

### Nova Scotia

**Halifax**
Adshead
Walmsley
**Wolfville**
Jeffery

### Ontario

**Hamilton**
Findlay
**Kingston**
Matheson
N. Miller
Watts
**London**
Kingston
**Ottawa**
G. V. Brady
**Toronto**
A. A. Grant
Wolfenden
*University of Toronto*
Beatty
Brauer
Burk
Coxeter
DeLury
Gilchrist
Krieger
Pounder
D. A. F. Robinson
G. de B. Robinson
Rosebrugh

Synge
Waddell
W. J. Webber
*Victoria University*
S. H. Gould

**Quebec**

**Lennoxville**
A. V. Richardson
**Montreal**
C. Craig
MacLean
Pall
A. N. Shaw
C. T. Sullivan
Tate
**Quebec**
Tremblay

**Saskatchewan**

**Saskatoon**
V. A. Ames
Ling

## ARGENTINA

**Buenos Aires**
Baidaff

## AUSTRALIA

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Wilton
**Brisbane**
Raybould
**Melbourne**
Cherry
**Perth**
Weatherburn
**Sydney**
Thorne

## AUSTRIA

**Vienna**
Gödel

## BELGIUM

**Ostend**
Bouckaert

## CANAL ZONE

**Gatun**
Eberman

## CHINA

**Canton**
Woo
**Peiping**
Kiang
Tseng
**Soochow**
Shen
**Tientsin**
Chiang

## CUBA

**Havana**
Corral-Aléman

## CZECHO-SLOVAKIA

**Prague**
Hlavatý

## DENMARK

**Copenhagen**
*Royal Technical College*
Jessen
*University of Copenhagen*
Bohr
Nörlund

## FINLAND

**Helsingfors**
Ahlfors

## FRANCE

**Paris**
*Catholic Institute*
Potron
*University of Paris*
Cartan
Fréchet

## GERMANY

**Berlin**
Bieberbach
**Freiburg i. Br.**
Bolza
**Giessen**
Geppert
**Hamburg**
Hecke
**Hannover**
Prange
**Leipzig**
Ackermann-Teubner
Hopf

## GREAT BRITAIN

**England**

**Birmingham**
Watson
**Bristol**
Fraser
**Cambridge**
Boas
Carslaw
Collingwood
P. Hall
G. H. Hardy
Larmor
Monroe
M. H. A. Newman
H. W. Richmond
Smithies
**Leeds**
W. P. Milne
**London**
Brill
Dalal
K. May
Western
*University of London*
H. Hilton
Taussky
**Manchester**
Mordell
**Oxford**
Dixon
Frecheville
A. E. H. Love
Whitehead
**Stocksfield-on-Tyne**
Hardcastle
**Suffolk**
Curjel

**Scotland**

**Dundee**
Copson
**Edinburgh**
Whittaker

**Wales**

**Bangor**
Berwick
**Cardiff**
Livens
**Swansea**
A. R. Richardson

## HUNGARY

**Budapest**
Féjer
C. Jordan
**Szeged**
de Kerékjárto

## INDIA

**Aligarh**
Shah
**Annamalainagar**
Rao
**Bangalore**
Iyengar
**Dacca**
Vijayaraghavan
**Delhi**
Seth
**Lucknow**
Varma
**Madras**
Ananda-Rau
**Poona**
Paranjpye

## IRAQ

**Baghdad**
Merrick

## IRELAND

**Belfast**
Povey
**Dublin**
McConnell
Rowe

## ITALY

**Milan**
Ricci
**Pisa**
Tonelli
**Rome**
Levi-Civita
Volterra
**Turin**
Fano
Opatowski

## JAPAN

**Chibaken**
Hirayama
**Osaka**
Nakayama
**Sapporo**
Kawaguchi
**Sendai**
Kubota
Takasu
**Tokyo**
Kuniyeda
Yoneda
Yoshida
**Yamagata**
Yanagihara

## NEW ZEALAND

**Auckland**
Forder
**Dunedin**
Martyn

**PALESTINE**
**Jerusalem**
Levitzki
Preiser

**PANAMA**
**Panama City**
Linares

**PERU**
**Lima**
García
de Losada y Puga

**POLAND**
**Cracow**
Rosenblatt
**Warsaw**
Dickstein

**SIAM**
**Bangkok**
Hadlock

**SPAIN**
**Madrid**
Flores

**STRAITS SETTLEMENTS**
**Singapore**
Oppenheim

**SWEDEN**
**Stockholm**
Oseen

**TASMANIA**
**Hobart**
J. C. Jaeger

**UNION OF SOVIET SOCIALIST REPUBLICS**
**Kief**
Kryloff

# BY-LAWS
# OF THE
# AMERICAN MATHEMATICAL SOCIETY

## ARTICLE I

### Officers

Section 1. The officers of the Society shall be a President, three Vice Presidents, a Secretary, four Associate Secretaries, a Treasurer, a Librarian, and four Editorial Committees of three members each—one for the *Bulletin*, one for the *Transactions*, one for the *Colloquium Publications*, and one consisting of the representatives of the Society on the Board of Editors of the *American Journal of Mathematics*.

Section 2. It shall be a duty of the President to deliver an address before the Society at the close of his term of office or within one year thereafter.

Section 3. The Librarian shall have charge of arrangements for the exchange of the Society's publications.

## ARTICLE II

### Board of Trustees

Section 1. There shall be a Board of Trustees consisting of five trustees elected by the Society, in accordance with Article IV.

Section 2. The function of the Board of Trustees shall be to receive and administer the funds of the Society, to have full legal control of its investments and properties, to make contracts and, in general, to conduct all business affairs of the Society.

## ARTICLE III

### Council

Section 1. The Council shall consist of the officers specified in Article I, of ex-secretaries who have served as Secretary for ten years or more, of ex-presidents for a period of six years after the expiration of their respective presidential terms, and of fifteen additional elected members chosen in accordance with Article IV, Section 2.

Section 2. Its function shall be to formulate and administer the scientific policies of the Society and to act in an advisory capacity to the Board of Trustees.

Section 3. At meetings of the Council five members shall constitute a quorum for the transaction of business. Between meetings business may be transacted by a mail vote. This shall require at least fifteen favorable votes and also that the number of these votes be three-quarters of those transmitted to the Secretary before the time announced for the closing of the polls. In case three or more members of the Council request postponement, at time of voting, action on the matter at issue shall be postponed until the next meeting of the Council, unless at the discretion of the Secretary the question is made the subject of a second letter vote, in connection with which brief statements of reasons, pro and con, are circulated to members.

## ARTICLE IV

### Election and Term of Office of Officers and Trustees

Section 1. The term of office shall be two years for the trustees, the President, the Vice Presidents, the Secretary, the Associate Secretaries, and the Treasurer; three years each for the Librarian, the Editorial Committees of the *Bulletin*, the *Transactions*, and the *Colloquium Publications*, and the fifteen elected members of the Council, five of the latter retiring annually; five years for the representatives of the Society on the Board of Editors of the *American Journal of Mathematics*. In every case, however, the trustees and officers shall continue until their successors shall have been duly elected and qualified. The President, the Vice Presidents, and the fifteen elected members of the Council shall not be eligible for immediate reelection to their respective offices.

Section 2. Election of trustees, officers, and members of the Council shall be by ballot at the Annual Meeting. An official ballot shall be sent to each member by the Secretary at least one month prior to the Annual Meeting, and such ballots, if returned to the Secretary in envelopes bearing the names of the voters and received prior to the closing of the polls, shall be counted at the Annual Meeting. Each ballot shall contain a name proposed by the Council for each office to be filled, with blank spaces in which the voter may substitute other names. A majority of all votes cast, whether in person or by mail, shall be necessary for election. In case of failure to secure a majority for any office, the members present at the Annual Meeting shall choose by ballot between the two having the highest number of votes.

Section 3. If the President of the Society die or resign, before the expiration of his term of office, the Council may, with the approval of the trustees, designate one of the Vice Presidents to serve as Acting President until the next Annual Meeting, when a President shall be elected by the Society. Such vacancies as may occur at any time among the other officers may be filled by the Council with the approval of the trustees.

Section 4. If any trustee die or resign during his tenure of office, the vacancy thus created shall be filled for his unexpired term by the Board of Trustees.

Section 5. If any elected member of the Council die or resign more than one year before the expiration of his term, the vacancy for the unexpired term shall be filled by the Society at the next Annual Meeting.

## ARTICLE V

### Election of Members

Section 1. Election of members shall be by vote of the Council.

Section 2. There shall be four classes of members, ordinary, contributing, institutional contributing, and sustaining.

Section 3. A firm, corporation, institution, association or individual interested in the support of mathematics, may be elected to sustaining membership. A sustaining member shall receive both the *Bulletin* and the *Transactions* (see Article X), and shall have the privilege of nominating one or more persons for election by the Council to ordinary membership in the Society, the number to be determined by the Council. Such nominations shall not be acted upon until at least thirty days after their presentation to the Council (at a meeting or by mail).

Section 4. A firm, corporation, institution, or association interested in the support of mathematics may be elected to institutional contributing membership. A contributing member shall receive the *Bulletin* or have the privilege, for each twenty-five dollars contributed, of nominating one person to ordinary membership in the Society. Such nominations shall not be acted upon until at least thirty days after their presentation to the Council (at a meeting or by mail).

Section 5. Except in the case of nominees of sustaining members and of institutional contributing members, application for admission to ordinary membership shall be made by the applicant, on a blank provided by the Secretary, and shall be approved by two members of the Society. Such applications shall not be acted upon until at least thirty days after their presentation to the Council (at a meeting or by mail), except in the case of members of other societies entering under special action of the Council.

Section 6. An ordinary member may become a contributing member by paying the dues for such membership.

## ARTICLE VI

### Dues

Section 1. Persons elected to ordinary membership in the Society by the Council, under the provisions of Article V, Section 5, shall be admitted to membership upon the payment, within sixty days of the date of their election, of an initiation fee of five dollars.

Section 2. The annual dues of persons elected by the Council to ordinary membership under the provisions of Article V, Section 5, shall be eight dollars, with the following exceptions: (1) during the first three years of membership, the annual dues shall be six dollars; a person shall be considered to have com-

pleted his first year of membership on January 1 following his election; (2) the amount of dues may be altered by reciprocity agreements with other societies; (3) the Council may make special rulings in exceptional cases, with the approval of the Board of Trustees; four dollars and fifty cents of the dues of each member shall be for a year's subscription to the *Bulletin*. Each new member shall pay in proportion to the unexpired fraction of the year at the time of his election.

Section 3. The minimum dues for a contributing member shall be fifteen dollars per year. Members may, upon their own initiative, pay larger dues.

Section 4. The dues for an institutional contributing member for any year shall not be less than twenty-five dollars. Institutions may pay larger dues.

Section 5. The dues of a sustaining member for any year shall not be less than one hundred dollars. A sustaining member who contributes annually at least five hundred dollars shall be designated as a Patron of the Society.

Section 6. Persons elected to ordinary membership as nominees of sustaining members or institutional contributing members under the provisions of Article V, Sections 3-4, shall not be required to pay an initiation fee. They shall not be required to pay dues, so long as it is agreed that they are designated by the sustaining member or institutional contributing member under these provisions. If a nominee of a sustaining member or an institutional contributing member later becomes a dues-paying member, he shall pay dues at the rate of six dollars a year for the remainder (if any) of his first three years of membership, and eight dollars a year thereafter.

Section 7. If the annual dues of any member remain unpaid beyond a reasonable time, the Board of Trustees shall remove his name from the list of members, after due notice.

Section 8. Any member not in arrears of dues may become a life member on the payment of a sum to be determined in accordance with actuarial principles.*

## ARTICLE VII

### Meetings

Section 1. The Annual Meeting of the Society shall be held between the fifteenth of December and the fifteenth of January next following. Notice of the time and place of this meeting shall be mailed by the Secretary or an Associate Secretary to the last known post office address of each member of the Society. The times and places of the Annual and other meetings of the Society shall be designated by the Council.

Section 2. The President may call a meeting of the Council whenever the affairs of the Society make it desirable; he shall call a meeting of the Council on written request of five of its members.

Section 3. The Board of Trustees shall have its regular Annual Meeting on the first day of the Annual Meeting of the Society. Special meetings of the Board of Trustees may be called by the Chairman of the Board upon three days' notice of such meeting mailed to the last known post office address of each trustee. He shall call a meeting upon the receipt of a written request of two of the trustees. Meetings for the transaction of business may also be held by common consent of all the trustees.

## ARTICLE VIII

### Sections

Whenever it shall appear to the Council that a sufficient number of members of the Society are desirous of conducting in any locality periodic meetings for the reading and discussion of mathematical papers, the Council may authorize the formation of a Section to be composed at each sectional meeting of such members of the Society as may be present; and the Council shall have the right to withdraw such authorization.

## ARTICLE IX

### Programs

Section 1. Papers intended for presentation at any meeting or sectional meeting of the Society shall be passed upon in advance by a program committee ap-

* See table on page 8.

pointed by or under the authority of the Council; and only such papers shall be presented as shall have been approved by such committee. Papers in form unsuitable for publication, if accepted for presentation, shall be referred to on the program as preliminary communications or reports.

Section 2. No matter of general business shall be considered at any meeting of the Society except the Annual Meeting without the recommendation of the Council.

## ARTICLE X

### Publications

Section 1. The Society shall publish an official organ called the *Bulletin of the American Mathematical Society* which shall be sent to each member of the Society; four dollars and fifty cents of the dues paid by each member shall be for a year's subscription to this publication. It shall publish a series of volumes called *Colloquium Publications*, which shall embody in book form new mathematical developments. It shall publish a journal, the object of which shall be to make known important researches presented at meetings of the Society; this journal shall be called the *Transactions of the American Mathematical Society*. It shall also coöperate in the conduct of the *American Journal of Mathematics*.

Section 2. The editorial management of the *Bulletin*, *Transactions*, and *Colloquium Publications* and the participation of the Society in the editorial management of the *American Journal of Mathematics* shall be in charge of committees as specified in Article I.

## ARTICLE XI

### Amendments

These By-Laws may be amended or suspended at any meeting of the Society on recommendation of the Council and by a two-thirds vote of the members present, provided notice of such proposed action and of its general nature shall have been given in the call for such meeting.

# REPORT OF THE TREASURER FOR THE PERIOD DECEMBER 1, 1935 TO NOVEMBER 30, 1936

## BALANCE SHEET

November 30, 1936

### ASSETS

| | | | |
|---|---|---|---|
| CASH IN BANKS: | | | |
| Corn Exchange Bank Trust Company | $ 8,932.83 | | |
| Bank for Savings | 2,673.50 | | |
| Providence Institution for Savings | 5,158.88 | | |
| Union Dime Savings Bank | 5,752.38 | $ 22,517.59 | |
| INVESTMENTS (Value based on market quotation as of November 30, 1936, $92,866.95.) | | 99,285.15 | |
| Total Assets | | | $121,802.74 |

### RESERVES AND SURPLUS

| | | | |
|---|---|---|---|
| RESERVES: | | | |
| Endowment Fund | $70,431.07 | | |
| Bôcher Fund | 1,955.49 | | |
| Cole Fund | 3,078.05 | | |
| Moore Fund | 4,030.39 | | |
| Reilly Fund | 6,558.26 | | |
| Life Memberships for 1937 | 6,115.91 | | |
| Sinking Fund | 5,000.00 | | |
| Semicentennial Celebration | 1,000.00 | | |
| Bulletin Reprinting and Index Fund | 637.13 | | |
| Transactions Reprinting and Index Fund | 108.59 | | |
| Transactions Life Subscription | 118.06 | | |
| Colloquium | 7,807.68 | $106,840.63 | |
| SURPLUS AT NOVEMBER 30, 1936 | | 14,962.11 | |
| Total Reserves and Surplus | | | $121,802.74 |

### STATEMENT OF GENERAL RECEIPTS AND GENERAL DISBURSEMENTS

| | | |
|---|---|---|
| GENERAL RECEIPTS: | | |
| Dues from Ordinary Memberships | $12,188.99 | |
| Dues from Contributing Memberships | 1,206.00 | |
| Dues from Institutional Memberships | 6,180.00 | |
| Initiation Fees | 769.37 | |
| Interest Income from Endowment Fund and General Investments | 3,568.64 | |
| Rockefeller Subvention | 2,250.00 | |
| General Contributions | 29.00 | |
| Miscellaneous | 653.72 | |
| Receipts at Summer Meeting 1936 | 3,146.00 | |
| Total General Receipts | | $29,991.72 |
| GENERAL DISBURSEMENTS: | | |
| Secretaries | $ 4,982.65 | |
| Treasurer | 550.00 | |
| Officers' Traveling | 412.63 | |
| Office Furniture and Fixtures | 287.34 | |
| Library | 719.48 | |
| Membership Committee | 197.81 | |

| | | |
|---|---|---|
| Semicentennial Committee | 100.00 | |
| Income Collection Expense | 120.14 | |
| Emergency | 426.24 | |
| American Journal Subvention | 2,500.00 | |
| Gibbs Lecture | 129.67 | |
| Stabilization Fund | 61.35 | |
| Expenses at Summer Meeting 1936 | 2,966.79 | |
| Total General Disbursements | | 13,454.10 |
| EXCESS OF GENERAL RECEIPTS OVER GENERAL DISBURSEMENTS | | $16,537.62 |

| | | |
|---|---|---|
| SURPLUS AT DECEMBER 3, 1935 | | $ 9,837.14 |
| Additions: | | |
| Balances at December 3, 1935 Transferred to Surplus | $ 4,910.26 | |
| Adjustment of Life Membership Reserve | 338.70 | |
| Adjustment of Transactions Life Subscription Reserve | 2.63 | |
| Excess of General Receipts over General Disbursements (see above) | 16,537.62 | 21,789.21 |
| Total | | $31,626.35 |
| Deductions: | | |
| Appropriation to Bulletin Account | $ 8,097.16 | |
| Appropriation to List of Members Account | 400.00 | |
| Appropriation to Transactions Account | 2,280.70 | |
| Appropriation to Colloquium Account | 1,250.00 | |
| Appropriation to Semicentennial Fund | 1,000.00 | |
| Appropriation to Sinking Fund | 3,500.00 | |
| Accrued Interest Purchased | 136.38 | 16,664.24 |
| SURPLUS AT NOVEMBER 30, 1936 | | $14,962.11 |

BULLETIN

| | | |
|---|---|---|
| BALANCE AT DECEMBER 3, 1935 | | $ 1,919.92 |
| Receipts: | | |
| Subscription Sales | $ 1,561.55 | |
| Reprint Sales | 123.06 | 1,684.61 |
| Appropriation from General Receipts | | 8,097.16 |
| Total | | $11,701.69 |
| Disbursements: | | |
| Printing (2 numbers for 1935, 10 for 1936) | $ 6,575.72 | |
| Salaries, Annuity and Pension | 2,252.26 | |
| Miscellaneous—Office Furniture, Supplies, etc. | 839.95 | |
| Editors' Traveling | 80.00 | |
| Circulars and Advertising | 33.84 | |
| Lapse of Unexpended Balance at December 3, 1935 | 1,919.92 | 11,701.69 |

BULLETIN—LIST OF MEMBERS

| | | |
|---|---|---|
| BALANCE AT DECEMBER 3, 1935 | | $ 400.00 |
| Appropriation from General Receipts | | 400.00 |
| Total | | $ 800.00 |
| Disbursements: | | |
| Salaries | $ 289.40 | |
| Printing | 489.14 | |
| Postage | 21.46 | 800.00 |

BULLETIN REPRINTING AND INDEX

| | | |
|---|---|---|
| BALANCE AT DECEMBER 3, 1935 | | $ 1,312.48 |
| Receipts: | | |
| Back Volume Sales | | 520.86 |
| Total | | $ 1,833.34 |
| Disbursements: | | |
| Reprinting | $ 668.78 | |
| Ten Year Index | 420.93 | |
| Clerical, etc. | 106.50 | 1,196.21 |
| BALANCE AT NOVEMBER 30, 1936 | | $ 637.13 |

TRANSACTIONS

| | | |
|---|---|---|
| BALANCE AT DECEMBER 3, 1935 | | $ 2,679.31 |
| Receipts: | | |
| Subscription Sales | $ 4,299.47 | |
| Back Volume Sales | 762.65 | |
| Reprint Sales | 149.84 | |
| Contributions | 24.00 | 5,235.96 |
| Appropriation from General Receipts | | 2,280.70 |
| Total | | $10,195.97 |
| Disbursements: | | |
| Printing (5 numbers for 1936) | $ 5,485.05 | |
| Salaries, Annuity and Pension | 1,557.48 | |
| Miscellaneous—Postage, Supplies, etc. | 364.29 | |
| Editors' Traveling | 76.00 | |
| Circulars and Advertising | 33.84 | |
| Lapse of Unexpended Balance at December 3, 1935 | 2,679.31 | 10,195.97 |

TRANSACTIONS REPRINTING AND INDEX

| | | |
|---|---|---|
| BALANCE AT DECEMBER 3, 1935 | | $ 459.14 |
| Disbursements: | | |
| Reprinting | | 350.55 |
| BALANCE AT NOVEMBER 30, 1936 | | $ 108.59 |

COLLOQUIUM

| | | |
|---|---|---|
| BALANCE AT DECEMBER 3, 1935 | | $ 6,785.11 |
| Receipts: | | |
| Sales of Colloquium Volumes | $ 3,194.51 | |
| Sales of Colloquium Volume 16 (Bliss) for National Research Council | 186.37 | |
| Colloquium Lecture Fees | 440.00 | |
| Appropriation from General Receipts by Order of Trustees | 1,250.00 | 5,070.88 |
| Total | | $11,855.99 |
| Disbursements: | | |
| Printing (Volume 20) | $ 2,734.35 | |
| Salaries | 725.00 | |
| Miscellaneous—Shipping, Supplies, etc. (including cost of shipping Volume 16 for National Research Council) | 255.50 | |
| Circulars and Advertising | 48.28 | |
| Customs and Duty | 40.26 | |

| | | |
|---|---|---|
| Payment to National Research Council for Volume 16 (Bliss) | 156.37 | |
| Colloquium Lecture Expenses | 88.55 | 4,048.31 |
| BALANCE AT NOVEMBER 30, 1936 | | $ 7,807.68 |

SPECIAL FUNDS

| ENDOWMENT FUND | Total | Investments | Cash |
|---|---|---|---|
| Balance at December 3, 1935 | $73,183.87 | $72,568.26 | $ 615.61 |
| Additions: | | | |
| Income and Gifts | 2,915.60 | | 2,915.60 |
| Total | $76,099.47 | $72,568.26 | $3,531.21 |
| Deductions: | | | |
| Transferred to General Receipts | 2,890.60 | | 2,890.60 |
| Accrued Interest Purchased | 2,777.80 | 2,777.80 | |
| Balance at November 30, 1936 | $70,431.07 | $69,790.46 | $ 640.61 |
| **BÔCHER FUND** | | | |
| Balance at December 3, 1935 | $ 1,892.40 | $ 1,663.60 | $ 228.80 |
| Additions: | | | |
| Income | 71.94 | | 71.94 |
| Redemption of Bond | 169.76 | | 169.76 |
| Total | $ 2,134.10 | $ 1,663.60 | $ 470.50 |
| Deductions: | | | |
| Accrued Interest Purchased | 8.85 | 8.85 | |
| Redemption of Bond | 169.76 | 169.76 | |
| Balance at November 30, 1936 | $ 1,955.49 | $ 1,484.99 | $ 470.50 |
| (Principal $1,188.00; Income $767.49.) | | | |
| **COLE FUND** | | | |
| Balance at December 3, 1935 | $ 2,971.63 | $ 2,523.02 | $ 448.61 |
| Additions: | | | |
| Income | 113.94 | | 113.94 |
| Redemption of Bond | 169.76 | | 169.76 |
| Total | $ 3,255.33 | $ 2,523.02 | $ 732.31 |
| Deductions: | | | |
| Accrued Interest Purchased | 7.52 | 7.52 | |
| Redemption of Bond | 169.76 | 169.76 | |
| Balance at November 30, 1936 | $ 3,078.05 | $ 2,345.74 | $ 732.31 |
| (Principal $2,093.13; Income $984.92.) | | | |
| **MOORE FUND** | | | |
| Balance at December 3, 1935 | $ 3,918.83 | $ 2,973.81 | $ 945.02 |
| Addition: | | | |
| Income | 142.87 | | 142.87 |
| Total | $ 4,061.70 | $ 2,973.81 | $1,087.89 |

| | | | |
|---|---|---|---|
| Deduction: | | | |
| Accrued Interest Purchased | 31.31 | 31.31 | |
| Balance at November 30, 1936 | $ 4,030.39 | $ 2,942.50 | $1,087.89 |
| (Principal $2,100.62; Income $1,929.77.) | | | |
| REILLY FUND | | | |
| Receipts | $ 6,531.00 | $ 6,208.50 | $ 322.50 |
| Income | 27.26 | | 27.26 |
| Balance at November 30, 1936 | $ 6,558.26 | $ 6,208.50 | $ 349.76 |
| (Principal $6,531.00; Income $27.26.) | | | |

P. A. SMITH
Treasurer

New York, N.Y.
November 30, 1936

## REPORT OF THE AUDITING COMMITTEE

### 1936

We, the undersigned Auditing Committee, appointed by the American Mathematical Society, have this day audited the accounts of the Treasurer and in our opinion the following statement is correct:

| | | |
|---|---|---|
| CASH BALANCE AT DECEMBER 3, 1935: | | |
| Corn Exchange Bank Trust Company | | $ 6,724.15 |
| Bank for Savings | | 2,620.71 |
| Providence Institution for Savings | | 5,032.29 |
| Union Dime Savings Bank | | |
| General | $3,400.72 | |
| Endowment Fund | 615.61 | |
| Bôcher Fund | 228.80 | |
| Cole Fund | 448.61 | |
| Moore Fund | 945.02 | 5,638.76 |
| | | $20,015.91 |
| Cash Receipts—December 3, 1935 to November 30, 1936 | | 39,892.66 |
| Interest on Savings Accounts | | 293.00 |
| Total | | $60,201.57 |
| Cash Disbursements—December 3, 1935 to November 30, 1936 | | 37,683.98 |
| CASH BALANCE AT NOVEMBER 30, 1936: | | |
| Corn Exchange Bank Trust Company | $8,932.83 | |
| Bank for Savings | 2,673.50 | |
| Providence Institution for Savings | 5,158.88 | |
| Union Dime Savings Bank | 5,752.38 | |
| | | $22,517.59 |

S. A. JOFFE
A. E. MEDER, JR.

New York, N.Y.
December 11, 1936

# REPORT OF THE TREASURER FOR THE PERIOD DECEMBER 1, 1936 TO NOVEMBER 30, 1937

## BALANCE SHEET

November 30, 1937

### ASSETS

| | | | |
|---|---|---|---|
| CASH IN BANKS: | | | |
| Corn Exchange Bank Trust Company | $ 3,579.88 | | |
| Bank for Savings | 2,727.35 | | |
| Union Dime Savings Bank | 5,868.30 | $ 12,175.53 | |
| INVESTMENTS (Value based on market quotation as of November 30, 1937, $90,396.75.) | | 118,582.45 | |
| Total Assets | | | $130,757.98 |

### RESERVES AND SURPLUS

| | | | |
|---|---|---|---|
| RESERVES: | | | |
| Endowment Fund | $70,456.07 | | |
| Böcher Fund | 2,107.49 | | |
| Cole Fund | 3,211.35 | | |
| Moore Fund | 4,173.89 | | |
| Reilly Fund | 6,729.84 | | |
| Life Memberships for 1938 | 5,865.38 | | |
| Sinking Fund | 8,000.00 | | |
| Semicentennial Celebration | 2,000.00 | | |
| Bulletin Reprinting and Index Fund | 108.55 | | |
| Transactions Reprinting and Index Fund | 38.59 | | |
| Transactions Life Subscription | 117.79 | | |
| Colloquium | 9,806.32 | $112,615.27 | |
| SURPLUS AT NOVEMBER 30, 1937 | | 18,142.71 | |
| Total Reserves and Surplus | | | $130,757.98 |

### STATEMENT OF GENERAL RECEIPTS AND GENERAL DISBURSEMENTS

| | | |
|---|---|---|
| GENERAL RECEIPTS: | | |
| Dues from Ordinary Memberships | $12,873.54 | |
| Dues from Contributing Memberships | 1,201.97 | |
| Dues from Institutional Memberships | 6,429.75 | |
| Initiation Fees | 400.42 | |
| Interest Income from Endowment Fund and General Investments | 4,061.88 | |
| General Contributions | 95.89 | |
| Miscellaneous | 489.15 | |
| Total General Receipts | | $25,552.60 |
| GENERAL DISBURSEMENTS: | | |
| Secretaries | $ 5,200.00 | |
| Treasurer | 613.98 | |
| Officers' Traveling | 550.00 | |
| Office Furniture and Fixtures | 57.96 | |
| Library | 579.42 | |
| Membership Committee | 200.00 | |
| Semicentennial Committee | 100.00 | |

| | | |
|---|---|---|
| Income Collection Expense | 265.24 | |
| American Journal Subvention | 2,500.00 | |
| Emergency | 375.41 | |
| Total General Disbursements | | 10,442.01 |
| EXCESS OF GENERAL RECEIPTS OVER GENERAL DISBURSEMENTS | | $15,110.59 |
| SURPLUS AT DECEMBER 1, 1936 | | $14,962.11 |
| Additions: | | |
| Adjustment for Amortization of Investments | $ 3,576.10 | |
| Adjustment of Prior Year's Income Distribution | 20.54 | |
| Adjustment of Life Membership Reserve | 250.53 | |
| Adjustment of Transactions Life Subscription Reserve | .27 | |
| Excess of General Receipts over General Disbursements (see above) | 15,110.59 | 18,958.03 |
| Total | | $33,920.14 |
| Deductions: | | |
| Appropriation to Bulletin Account | $ 7,981.16 | |
| Appropriation to Transactions Account | 2,546.27 | |
| Appropriation to Colloquium Account | 1,250.00 | |
| Appropriation to Semicentennial Fund | 1,000.00 | |
| Appropriation to Sinking Fund | 3,000.00 | 15,777.43 |
| SURPLUS AT NOVEMBER 30, 1937 | | $18,142.71 |

BULLETIN

| | | |
|---|---|---|
| Receipts: | | |
| Subscription Sales | $ 1,605.74 | |
| Reprint Sales | 95.30 | $ 1,701.04 |
| Appropriation from General Receipts | | 7,981.16 |
| Total | | $ 9,682.20 |
| Disbursements: | | |
| Printing (2 numbers for 1936, 10 for 1937) | $ 6,295.31 | |
| Salaries, Annuity and Pension | 2,463.35 | |
| Miscellaneous—Office Furniture, 1938 List of Members Expenses, Supplies, etc. | 839.54 | |
| Editors' Traveling | 84.00 | 9,682.20 |

BULLETIN REPRINTING AND INDEX

| | | |
|---|---|---|
| BALANCE AT DECEMBER 1, 1936 | | $ 637.13 |
| Receipts: | | |
| Back Volume Sales | | 339.85 |
| Total | | $ 976.98 |
| Disbursements: | | |
| Reprinting | | 868.43 |
| BALANCE AT NOVEMBER 30, 1937 | | $ 108.55 |

TRANSACTIONS

| | | |
|---|---|---|
| Receipts: | | |
| Subscription Sales | $ 4,694.10 | |
| Back Volume Sales | 785.75 | |
| Reprint Sales | 125.61 | |
| Contributions | 20.00 | $ 5,625.46 |
| Appropriation from General Receipts | | 2,546.27 |
| Total | | $ 8,171.73 |

| | | |
|---|---|---|
| Disbursements: | | |
| Printing (1 number for 1936, 5 for 1937) | $ 6,169.45 | |
| Salaries, Annuity and Pension | 1,502.00 | |
| Miscellaneous—Postage, Supplies, etc. | 400.28 | |
| Editors' Traveling | 100.00 | 8,171.73 |

TRANSACTIONS REPRINTING AND INDEX

| | | |
|---|---|---|
| BALANCE AT DECEMBER 1, 1936 | | $ 108.59 |
| Disbursements: | | |
| Reprinting | | 70.00 |
| BALANCE AT NOVEMBER 30, 1937 | | $ 38.59 |

COLLOQUIUM

| | | |
|---|---|---|
| BALANCE AT DECEMBER 1, 1936 | | $ 7,807.68 |
| Receipts: | | |
| Sales of Colloquium Volumes | $ 2,267.45 | |
| Sales of Colloquium Volume 16 (Bliss) for National Research Council | 115.20 | |
| Colloquium Lecture Fees | 339.00 | |
| Appropriation from General Receipts by Order of Trustees | 1,250.00 | |
| Contribution from the Charles Phelps Taft Memorial Fund, University of Cincinnati | 600.00 | 4,571.65 |
| Total | | $12,379.33 |
| Disbursements: | | |
| Printing (Volume 21) | $ 1,038.52 | |
| Salaries | 751.00 | |
| Miscellaneous—Shipping, Supplies, etc. (including cost of shipping Volume 16 for National Research Council) | 305.78 | |
| Circulars and Advertising | 68.06 | |
| Customs and Duty | 270.69 | |
| Payment to National Research Council for Volume 16 (Bliss) | 89.20 | |
| Colloquium Lecture Expenses | 49.76 | 2,573.01 |
| BALANCE AT NOVEMBER 30, 1937 | | $ 9,806.32 |

SPECIAL FUNDS

| ENDOWMENT FUND | Total | Principal | Income |
|---|---|---|---|
| Balance at December 1, 1936 | $70,431.07 | $70,431.07 | |
| Additions: | | | |
| Income and Gifts | 2,538.76 | 25.00 | $2,513.76 |
| Adjustment for Amortization of Investments | 3,174.27 | | 3,174.27 |
| Total | $76,144.10 | $70,456.07 | $5,688.03 |
| Deduction: | | | |
| Transferred to General Receipts and Surplus | 5,688.03 | | 5,688.03 |
| Balance at November 30, 1937 | $70,456.07 | $70,456.07 | |

| BÔCHER FUND | | | |
|---|---|---|---|
| Balance at December 1, 1936 | $ 1,955.49 | $ 1,188.00 | $ 767.49 |
| Additions: | | | |
| Income | 69.35 | | 69.35 |
| Adjustment for Amortization of Investments | 87.33 | | 87.33 |
| Total | $ 2,112.17 | $ 1,188.00 | $ 924.17 |

| | | | |
|---|---|---|---|
| Deduction: | | | |
| Adjustment of Prior Year's Income Distribution | 4.68 | | 4.68 |
| Balance at November 30, 1937 | $ 2,107.49 | $ 1,188.00 | $ 919.49 |
| **Cole Fund** | | | |
| Balance at December 1, 1936 | $ 3,078.05 | $ 2,093.13 | $ 984.92 |
| Additions: | | | |
| Income | 108.35 | | 108.35 |
| Adjustment for Amortization of Investments | 32.23 | | 32.23 |
| Total | $ 3,218.63 | $ 2,093.13 | $1,125.50 |
| Deduction: | | | |
| Adjustment of Prior Year's Income Distribution | 7.28 | | 7.28 |
| Balance at November 30, 1937 | $ 3,211.35 | $ 2,093.13 | $1,118.22 |
| **Moore Fund** | | | |
| Balance at December 1, 1936 | $ 4,030.39 | $ 2,100.62 | $1,929.77 |
| Additions: | | | |
| Income | 138.69 | | 138.69 |
| Adjustment for Amortization of Investments | 13.39 | | 13.39 |
| Total | $ 4,182.47 | $ 2,100.62 | $2,081.85 |
| Deduction: | | | |
| Adjustment of Prior Year's Income Distribution | 8.58 | | 8.58 |
| Balance at November 30, 1937 | $ 4,173.89 | $ 2,100.62 | $2,073.27 |
| **Reilly Fund** | | | |
| Balance at December 1, 1936 | $ 6,558.26 | $ 6,531.00 | $ 27.26 |
| Addition: | | | |
| Income | 221.04 | | 221.04 |
| Total | $ 6,779.30 | $ 6,531.00 | $ 248.30 |
| Deduction: | | | |
| Adjustment for Amortization of Investments | 49.46 | | 49.46 |
| Balance at November 30, 1937 | $ 6,729.84 | $ 6,531.00 | $ 198.84 |

P. A. Smith
Treasurer

New York, N.Y.
November 30, 1937

## REPORT OF THE AUDITING COMMITTEE

### 1937

We, the undersigned Auditing Committee, appointed by the American Mathematical Society, have this day audited the accounts of the Treasurer and in our opinion the following statement is correct:

| | | |
|---|---|---|
| CASH BALANCE AT DECEMBER 1, 1936: | | |
| Corn Exchange Bank Trust Company | $8,932.83 | |
| Bank for Savings | 2,673.50 | |
| Providence Institution for Savings | 5,158.88 | |
| Union Dime Savings Bank | 5,752.38 | $22,517.59 |
| Cash Receipts—December 1, 1936 to November 30, 1937 | | 36,860.23 |
| Interest on Savings Accounts in Bank for Savings and Union Dime Savings Bank | | 169.77 |
| Total | | $59,547.59 |
| Cash Disbursements—December 1, 1936 to November 30, 1937 | | 47,372.06 |
| CASH BALANCE AT NOVEMBER 30, 1937: | | |
| Corn Exchange Bank Trust Company | $3,579.88 | |
| Bank for Savings | 2,727.35 | |
| Union Dime Savings Bank | 5,868.30 | |
| | | $12,175.53 |

S. A. JOFFE
A. E. MEDER, JR.

New York, N.Y.
December 16, 1937

## PUBLICATIONS

JOURNALS

*Bulletin of the American Mathematical Society.*
*Transactions of the American Mathematical Society.*

BOOKS

*Mathematical Papers Read at the International Mathematical Congress*, 1896, xvi, 411 pp. $4.70

F. Klein, *The Evanston Colloquium Lectures on Mathematics*, 1894, x, 109 pp.; reprinted, 1911, xii, 109 pp. 1.00

COLLOQUIUM SERIES

1. H. S. White, *Linear Systems of Curves on Algebraic Surfaces*; F. S. Woods, *Forms of Non-Elucidean Space*; E. B. Van Vleck, *Selected Topics in the Theory of Divergent Series and of Continued Fractions*; 1905, xii, 187 pp. $3.00
2. E. H. Moore, *Introduction to a Form of General Analysis*; M. Mason, *Selected Topics in the Theory of Boundary Value Problems of Differential Equations*; E. J. Wilczynski, *Projective Differential Geometry*; 1910, x, 222 pp. Out of print
3$_1$. G. A. Bliss, *Fundamental Existence Theorems*, 1913; reprinted, 1934, iv, 107 pp. 2.00
3$_2$. E. Kasner, *Differential-Geometric Aspects of Dynamics*, 1913; reprinted, 1934, iv, 117 pp. 2.00
4. L. E. Dickson, *On Invariants and the Theory of Numbers*; W. F. Osgood, *Topics in the Theory of Functions of Several Complex Variables*; 1914, xviii, 230 pp. Out of print
5$_1$. G. C. Evans, *Functionals and Their Applications. Selected Topics, Including Integral Equations*, 1918, xii, 136 pp. Out of print
5$_2$. O. Veblen, *Analysis Situs*, 1922; second ed., 1931, x, 194 pp. 2.00
6. G. C. Evans, *The Logarithmic Potential. Discontinuous Dirichlet and Neumann Problems*, 1927, viii, 150 pp. 2.00
7. E. T. Bell, *Algebraic Arithmetic*, 1927, iv, 180 pp. 2.70
8. L. P. Eisenhart, *Non-Riemannian Geometry*, 1927; reprinted, 1934, viii, 184 pp. 2.70
9. G. D. Birkhoff, *Dynamical Systems*, 1927, viii, 295 pp. 3.35
10. A. B. Coble, *Algebraic Geometry and Theta Functions*, 1929, viii, 282 pp. 3.35
11. D. Jackson, *The Theory of Approximation*, 1930, viii, 178 pp. Out of print
12. S. Lefschetz, *Topology*, 1930, x, 410 pp. 5.35
13. R. L. Moore, *Foundations of Point Set Theory*, 1932, viii, 486 pp. 6.00
14. J. F. Ritt, *Differential Equations from the Algebraic Standpoint*, 1932, x, 172 pp. 2.70
15. M. H. Stone, *Linear Transformations in Hilbert Space and Their Applications to Analysis*, 1932, viii, 622 pp. 8.00
16. G. A. Bliss, *Algebraic Functions*, 1933, x, 218 pp. 3.35
17. J. H. M. Wedderburn, *Lectures on Matrices*, 1934, viii, 200 pp. 3.35
18. M. Morse, *The Calculus of Variations in the Large*, 1934, x, 368 pp. 5.35
19. R. E. A. C. Paley and N. Wiener, *Fourier Transforms in the Complex Domain*, 1934, viii, 184 pp. + portrait plate. 3.35
20. J. L. Walsh, *Interpolation and Approximation by Rational Functions in the Complex Domain*, 1935, x, 382 pp. 6.00
21. J. M. Thomas, *Differential Systems*, 1937, x, 118 pp. 2.00
22. C. N. Moore, *Summable Series and Convergence Factors*, 1938, vi, 105 pp. 2.00